

Virginia to Permit Mixtures of Plant Food and Pesticide

**Aldrin and Heptachlor May
Be Included in Fertilizer
In 1959, State Announces**

RICHMOND, VA.—Sale and distribution of fertilizer-pesticide mixtures containing aldrin or heptachlor will be permitted for the 1959 season by the Virginia Department of Agriculture, according to an announcement by Rodney C. Berry, director of the division of Chemistry and Foods.

Permits for sale and distribution of such mixtures will be given only when the product is properly registered, packaged and labeled, Mr. Berry stated in a release last week. Mixtures recommended by the Virginia Agricultural Experiment Station are for control of the Southern rootworm attacking peanuts; for the same pest, seed corn maggot and wireworms attacking corn, or for the control of alfalfa weevil attacking alfalfa.

The only mixtures to be allowed are as follows: Eight lb. aldrin or heptachlor a ton in 0-10-20; 2-12-12; and 3-9-18 on peanuts and/or corn.

Eight pounds aldrin or heptachlor a ton in 5-10-10 and 10-10-10 for corn only.

Four pounds heptachlor a ton in 0-10-20; 0-9-27; 0-14-14; and 0-20-20 for alfalfa only. Eight pounds heptachlor a ton in 0-10-20; 0-9-27; 0-14-14; and 0-20-20 for alfalfa only. Eight pounds heptachlor a ton in 0-10-20; 0-9-27; 0-14-14; and 0-20-20 for alfalfa only.

(Turn to VIRGINIA LAW, page 4)

Coding System for Nitrogen Solutions Suggested by NPFI

WASHINGTON—A coding system for improving the nomenclature of nitrogen solutions is being submitted to the U.S. Department of Commerce by the National Plant Food Institute, as a suggested standard for the industry to follow.

Dr. Russell Coleman, executive vice president of the Institute, in a note to NPFI members who are nitrogen producers, reviewed the progress toward adoption of recommendations made earlier by a special industry committee for improving the nomenclature of nitrogen solutions, and reported that only a few suggestions for minor changes have been received from the industry, and that very few of the nitrogen producers had expressed objections.

The recommendations of the special committee, submitted to the (Turn to SOLUTIONS CODE, page 17)

U.S. Bureau of Mines Reports Sulfur Production

WASHINGTON—The domestic sulphur industry produced 359,384 long tons of native sulfur and 47,173 tons of recovered sulfur during July, reports the Bureau of Mines, U.S. Department of Interior.

The information, based on reports of producers, showed stocks of native sulfur were increased slightly over June and on July 31 totaled 4,721,167 tons.

Progress in Pesticidal Chemical Development Discussed by Canadians

WINNIPEG—Some 120 representatives of Canada's agricultural chemical trade met in Winnipeg Sept. 15-17 for the sixth annual convention of the Canadian Agricultural Chemicals Assn. Highlighting the convention program was a symposium that emphasized the progress made in the development of chemicals for insect, weed and fungi control and the need for continuing such research.

Taking part in the symposium were Dr. L. H. Shebeski, of the University

of Manitoba's plant science department, who spoke on herbicides; W. B. Fox, western representative, development and technical service department, Chipman Chemicals Ltd., insecticides; and Dr. W. E. Sackston, officer-in-charge, Canada Department of Agriculture's botany and plant pathology division, spoke on fungicides and seed dressing.

Dr. Sackston pointed to the critical need for research on the "ecology and inter-relationships" of bacteria, fungi and insects, to determine long-term effects of agricultural methods, whether they are cultural practices or the use of pesticidal chemicals.

"Although discovery of new chemicals to control diseases, insects and weeds in major crops is extremely important, the chemicals must be used carefully. Even though these materials are perfectly safe for man and his domestic animals, and they control important diseases or pests they may affect desirable insects or micro-organisms. When the 'balance of nature' is upset, brand new problems may appear as the direct result of the control measures used," he said.

A satisfactory picture to distribution of the various species of weeds across Canada, according to Dr. Shebeski, is not yet available. "Neither do we have sufficient data on the competitive effect of the different weed species." He went on to explain that it is this type of information that should be of importance in determining the type of new chemicals that are most needed.

It was his suggestion that all (Turn to CANADIAN MEETING, page 21)

CANADIAN OFFICERS

WINNIPEG—J. H. Elliott of Rohm & Haas Co. of Canada, Ltd., was elected president of the Canadian Agricultural Chemicals Assn. at its sixth annual conference here.

Other officers elected included Bruce Marr, Naugatuck Chemicals Division of Dominion Rubber Co., Ltd., first vice president; J. K. Brown, Green Cross Division of the Sherwin-Williams Co. of Canada, Ltd., second vice president; J. S. Wilson, Dow Chemical of Canada, Ltd., secretary, and D. K. Jackson, Monsanto Canada, Ltd., treasurer.

Members of the board of directors are: G. E. Willan, Niagara Brand Chemicals, Burlington, Ontario; Lucien Plante, Marquette Products, Ltd., Quebec; C. R. Burrows, Allied Chemical Canada, Ltd., Toronto; E. G. Law, Allied Chemical Service, Ltd., Calgary; J. G. Hastings, Chipman Chemicals, Ltd., Hamilton, and W. H. Silversides, Interprovincial Co-operatives, Ltd., Winnipeg.

81% of U.S. Potato Acreage Fertilized, USDA Study Shows

By J. R. Adams, L. B. Nelson and D. B. Ibach

Drs. Adams and Nelson are with the Soil and Water Conservation Research Division, and Mr. Ibach with the Farm Economics Research Division, Agricultural Research Service, U.S. Department of Agriculture, Beltsville, Md.

VII. Potatoes

(Excluding Sweet Potatoes)

EIGHTY-ONE per cent of the harvested potato acreage received fertilizer during 1954, making this one of the most widely fertilized crops in the U.S. Average application rates to the fertilized acre were 84 lb. N, 115 lb. available P₂O₅, and 102 lb. K₂O.

The 1954 averages for the U.S. are little changed from those estimated for 1947 (2) and 1950 (3, p. 126) with reference to both the percentage of the acreage fertilized and the rates of nutrient application. Some shifts between regions, however, have occurred. The percentage of the acreage fertilized decreased somewhat in the Southern Plains and Mississippi Delta States, but increased rather markedly in the Northern Plains,

possibly due to the drouths in the southern plains and Delta areas during and immediately preceding 1954.

Rates of N application increased in the Mountain, Northern Plains, Corn Belt and Lake States, and decreased in the Delta and Appalachian States. Phosphate rates increased in the Southeast and Corn Belt and Lake States and decreased in the Delta States. Potash rates increased in the Southeast, Corn Belt and Lake States, and the Northeast, and decreased in the Delta States.

Data and estimates on acreages, intensity of fertilization, and rates of application per fertilized acre are shown in Table 1 and by the maps in Figures 1, 2, 3 and 4.

Seven States: Maine, Rhode Is- (Turn to FERTILIZER USE, page 20)

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100 Visitors Expected At Connecticut Meeting

NEW HAVEN—About 100 persons are expected to attend the second national conference on agricultural meteorology, to be held here on Oct. 22-24 at the Connecticut Agricultural Experiment Station and the Forestry School of Yale University.

Paul E. Waggoner, head of the department of soils and climatology at the station, is general chairman. The meeting is sponsored by the American Meteorological Society. Program chairman is A. Vaughn Havens of Rutgers University.

Sessions are planned on climatological needs of agriculture, evapotranspiration and water relationships, statistical methods, forecasting for agricultural operations, and observations and instrumentation.

Meetings of the regional technical committees on the application of meteorology to agriculture in the northeastern and northcentral states will precede the national conference.

Pennsylvania Dealers to Get Fertilizer, Seed Plans

UNIVERSITY PARK, PA.—Recommendations on seeds, lime and fertilizer for Pennsylvania farmers in 1959 will be presented to local farm supply dealers at eleven district meetings across the state by extension agronomists of Penn State University, it was announced.

Subjects for discussion will include new field crop varieties, lawn management, new herbicides, proper use of lime and fertilizer.

Dr. C. S. Bryner, who will be in charge, said copies of the new edition of the Agronomy Guide for 1959 will be distributed.

The schedule of meetings: Oct. 5, Lake LeBoeuf, near Waterford, for Erie, Crawford, Forest and Warren counties; Oct. 20, Bellefonte, for Centre, Blair, Clinton, Huntingdon, Juniata and Mifflin counties; Oct. 21, Bloomsburg, for Columbia, Luzerne, Montour, Northumberland, Lycoming, Snyder and Union counties; Oct. 28, Uniontown, for Fayette, Greene, Somerset, Washington and Westmoreland counties; Oct. 29, New Castle, for Lawrence, Allegheny, Beaver, Butler, Mercer and Venango counties.

Oct. 31, Punxsutawney, for Jefferson, Armstrong, Cambria, Clarion, Clearfield and Indiana counties; Nov.

5, Potato City Hotel, Coudersport, for Potter, Cameron, Elk, McKean and Tioga counties; Nov. 7, Wysox, for Bradford, Lackawanna, Susquehanna, Wayne, Pike, Sullivan, and Wyoming counties; Nov. 11, Chambersburg, for Franklin, Adams, Bedford, Cumberland, Fulton and Perry counties.

Nov. 12, Lancaster County Farm Bureau, Lancaster, for Lancaster, southern Berks, Chester, Dauphin, Delaware, Lebanon, Philadelphia and York counties; Nov. 13, Allentown, for Lehigh, northern Berks, Bucks, Carbon, Monroe, Montgomery, Northampton and Schuylkill counties.

NPFI Starts Undergrad Scholarship at Tennessee

WASHINGTON—An undergraduate agronomy award has been established at the University of Tennessee at Knoxville, it was announced jointly by Dean N. D. Peacock and Prof. L. N. Skold of the college of agriculture, and Dr. Samuel L. Tisdale, National Plant Food Institute southeastern regional director.

The recipient of the NPFI award will receive \$200, a plaque, and a key engraved with his name. It will be awarded each year to a senior majoring in the field of agronomy. The selection of the student will be based on his scholastic attainment, extra-curricular activities, and the promise which he holds for future contributions to the field of agriculture.

Selection of the student will be made by a committee of faculty members.

The establishment of the undergraduate award at the University of Tennessee is one of several such awards being supported by NPFI in the Southeast.

Named to Committee

HOUSTON, TEXAS—S. F. Spence of American Cyanamid Co. was elected chairman of the Manufacturing Chemists' Association's general safety committee here.

The election came at a committee meeting held prior to a workshop attended by approximately 70 safety officials from chemical plants in Texas and Louisiana. The workshop was sponsored by the MCA in cooperation with the Texas Chemical Council. Mr. Spence succeeds G. L. Gorbell of Monsanto Chemical Co.

Soil Test, Proper Fertilization Program Key to Top Crop Yields, Survey Shows

EAST LANSING, MICH.—Wheat growers who have their soil tested and then follow the recommendations for fertilizer applications cash in on top yields, a survey of wheat producers in Gratiot County shows.

The survey covered 68 wheat producers and was conducted by John Baker, Gratiot County agricultural agent, and Lynn Robertson, soils scientist at Michigan State University.

Mr. Baker and Mr. Robertson drew two conclusions from the study. One—soil test information is invaluable in determining the ratios of fertilizer to use on any one field; and two—less than \$2 worth of additional phosphate meant the difference of more than \$30 additional income.

The 34 farmers who had the highest yields averaged 66.5 bu. wheat per acre. The lower yielding 34 farmers averaged 49 bu. or 17.5 bu. less than the top group.

The high yield group used an average of 36 lb. nitrogen, 64 lb. phosphate and 49 lb. potash. The low farmers used 33 lb. nitrogen, 44 lb. phosphate and 40 lb. potash per acre.

The extra 20 lb. of phosphate used by the high producing farmers seems to account for most of the extra 17.5

bu. wheat, Mr. Baker and Mr. Robertson say. At 8¢ lb., the extra 20 lb. of phosphate has a value of \$1.60. If wheat is worth \$1.75 bu., the extra 17.5 bu. means an additional \$30.63 income.

Twenty-nine farmers in the survey had their soil tested in time for fertilizer recommendations to be made. These 29 farmers averaged 60.5 bu. wheat. The others averaged only 55 bu. per acre.

This difference in yield is a result of the grades of fertilizer the two groups of farmers used, the two men feel. Of the 29 farmers who used soil test information, 48% bought an x:2:1 ratio fertilizer (x means any amount). Only 11% of the 44 farmers who did not have the benefit of soil tests used this ratio. The rest used a 1:1:1 ratio fertilizer.

Of those who had their soil tested and purchased fertilizer accordingly, 90% used a 1:2:x ratio fertilizer while only 54% of the other group used this ratio fertilizer.

The rest of the farmers who did not have the soil test information used a 1:1:1 ratio fertilizer in an effort to supply ample nitrogen. But the end result was not using enough phosphate.



AT LABORATORY DEDICATION—Schrock Fertilizer Service, Congerville, Ill., dedicated its new consolidated laboratories as a new division of the company on Sept. 10. Above is Norm Kraefft, farm service director of radio station WGN, Chicago, in center, flanked by Kenneth Cross, left, sales manager, and W. O. Frazier, president, right, of Schrock Fertilizer Service. The dedication ceremonies, at which Mr. Kraefft was principal speaker, were attended by some 250 persons.

New Laboratories Are Dedicated in Illinois

CONGERVILLE, ILL.—Approximately 250 people convened here Sept. 10 to dedicate Consolidated Laboratories, a newly-formed division of Schrock Fertilizer Service. Principal speaker at the dedication ceremony was Norm Kraefft, WGN farm service director, Chicago. In his talk, the progress of agriculture during the last 25 years, was reviewed, showing how farming has developed into a major business enterprise in our economy.

"There is considerable misunderstanding about farming on the part of many city people," Mr. Kraefft said, and continued by stressing the need for specific programs to present the farmer's problems to city

people who seem to believe that "farming is so profitable and there is so much subsidy from the government, that every farmer has a Cadillac in his garage."

Farmers, agronomists and farm managers attending the open house pointed to the new laboratory facilities as an important tool for helping farmers analyze their soil.

Selection of equipment and procedures was made after a study of laboratories in several state universities, it was reported. Equipment in the laboratory includes the "Spectronic 20" for interpretation, a custom built pH meter, a distillation apparatus for available nitrogen test, a soil grinding and screening unit, and automatic pipette machines for metering of reagents. The soil processing room has a capacity of 2,000 samples per day, the company said.

IMC Names Dealers as Advisory Board Members

SKOKIE, ILL.—The Four Leaf Phosphate Dept. of International Minerals & Chemical Corp. has named six fertilizer dealers as an advisory board to help expand its services to farmers and dealers in farm chemicals and fertilizers, the company has announced.

Describing the group, J. L. Mealy, sales manager for IMC rock phosphate, pointed out that the group gives a "grass-roots" approach to meeting farm and marketing problems of special interest to the dealer, distributor and manufacturer of fertilizers. "Dealers chosen have had long experience in the agricultural

market, and their counsel will be most helpful," he said.

The board includes William Edwards, Pontiac, Ill.; Lewis Flohr, Urbana, Ind.; Hugh Graham, Trenton, Mo.; James Prather, Tarkio, Mo.; William Parrish, Auburn, Ill., and Rome Schwagel, Sharpsburg, Md.

At a two-day meeting held in IMC's new administrative and research center in Skokie (suburban Chicago), the board joined International specialists in discussing advertising, sales promotion, market research, and customer needs and motivations. The result was a program for dealers to include customer surveys, sales analyses, price and credit reports, advertising promotion plans, and other merchandising ideas to be reviewed by the board in semi-annual meetings.

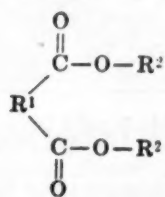


ADVISORY BOARD NAMED—Fertilizer dealers named to customer advisory board organized by phosphate minerals and marketing divisions of International Minerals & Chemical Corp. were welcomed at a recent meeting in the firm's new administrative and research center, Skokie, Ill. The group included (left to right, standing): S. T. Keel, sales manager, phosphate minerals; J. L. Mealy, sales manager, rock phosphate; F. A. Koechlein, general manager, phosphate minerals; A. E. Casano, vice president, marketing; N. G. Schenel, manager, sales service; James Prather, dealer and board member, Tarkio, Mo.; William Parrish, dealer and board member, Auburn, Ill.; and H. R. Halden, assistant sales manager, rock phosphate. Seated are Hugh Graham, dealer and board member, Trenton, Mo.; G. W. Moyers, IMC vice president, phosphate minerals; three dealer-members of the group: Lewis Flohr, Urbana, Ind.; William Edwards, Pontiac, Ill.; Rome Schwagel, Sharpsburg, Md.

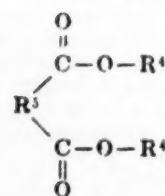
Industry Patents and Trademarks

2,852,426

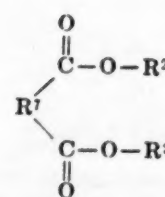
Nematocides Containing Carboxylic Acids and Their Esters and Method. Patent issued Sept. 16, 1958, to Roy E. Stansbury, Bartlesville, Okla., assignor to Phillips Petroleum Co. A method of controlling nematodes which comprises treating nematode-infested soil with an effective nematocidal amount of at least one of the compounds selected from the group of compounds having the following structural characteristics:



and



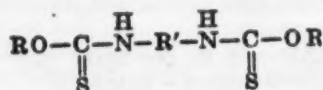
and



wherein R^1 is a divalent aliphatic hydrocarbon radical containing 5-9 carbon atoms; R^2 is selected from the group consisting of hydrogen and a saturated hydrocarbon radical containing 1-6 carbon atoms; R^3 is selected from the group consisting of hydrogen and a saturated hydrocarbon radical containing 1-3 carbon atoms; R^4 is a divalent aliphatic hydrocarbon radical containing 2-4 carbon atoms; R^5 is a divalent aliphatic hydrocarbon radical containing a single carbon atom; the radicals represented by R^2 can be different; the radicals represented by R^3 can be different; and hydroxy-substituted derivatives of said compounds, the hydroxy substitution being in the portion of the compound resulting from the acid.

2,852,361

Method of Defoliating Plants with Alkylenebis (Thionocarbamates). Patent issued Sept. 16, 1958, to Thomas E. Lesslie, St. Albans, W.Va., assignor to Monsanto Chemical Co., St. Louis, Mo. A method of defoliating plants which comprises applying thereto in amount sufficient to effect defoliation a composition comprising as the essential active ingredient a compound of the structural formula



where R is selected from a group consisting of lower alkyl and lower alkenyl groups and R' is ethylene.

2,852,340

Method of Producing Ammonium Nitrate and Magnesium Hydroxide. Patent issued Sept. 16, 1958, to Otto Kippe, Osnabruck, Germany, assignor of one half to Paul O. Tobeler, doing business as Trans-Oceanic, Los Angeles, Cal. The method of producing ammonium nitrate and magnesium hydroxide from crude dolomite, that includes dissolving crude dolomite in nitric acid to form calcium nitrate and magnesium nitrate in solution, reacting a concentrated aqueous solution of magnesium sulfate with said resulting nitrates in solution to precipitate substantially all of the calcium content thereof as calcium sulfate and to form a concentrated mag-

nesium nitrate solution, separating substantially all of the calcium sulfate precipitate from the concentrated magnesium nitrate solution, and reacting said concentrated magnesium nitrate solution containing substantially all of the magnesium content of said starting dolomite and magnesium sulfate with sufficient ammonia to precipitate over 95% of the magnesium content of said solution as calcinable magnesium hydroxide and to produce separable ammonium nitrate.

2,852,344

Production of Ammonia from Blast Furnace Gas. Patent issued Sept. 16, 1958, to Herbert Köbel, Moers, Germany, assignor to Rheinpreussen Aktiengesellschaft für Bergbau und Chemie, Homberg, Lower Rhine, Germany. Method for the utilization of substantially sulfur free blast furnace waste gases obtained from iron smelting which gas essentially consists of carbon monoxide and nitrogen and contains a small amount of carbon dioxide, hydrogen and hydrocarbons, which comprises passing such a practically sulfur-free blast furnace waste gas in the presence of a member selected from the group consisting of hydrogen, steam, and mixtures thereof in contact with a carbon monoxide hydrogenation catalyst under synthesis conditions of temperature and pressure, recovering the synthesis products obtained, recovering from the gas after said contacting the carbon dioxide produced from said contacting under synthesis conditions along with any residual carbon dioxide present in said waste gas, and thereafter passing the gas said gas being substantially pure nitrogen and entirely sulfur free in contact with an ammonia synthesis catalyst under ammonia synthesis conditions and recovering the ammonia produced.

2,852,342

Manufacture of Sulphate of Ammonia. Patent issued Sept. 16, 1958, to Kenneth MacGregor, Bramhall, England, assignor to Simon-Carves Ltd., Cheadle Heath, England. In a method of reducing the acidity of ammoniacal liquor obtained by contacting gases from a carbonization plant with a liquor containing free sulphuric acid in a single step, followed by the production of sulphate of ammonia in an evaporator, the intermediate step of contacting the ammoniacal liquor contained in the said single stage scrubber with the ammonia vapors from the ammonia still in order to reduce the free acid content of the said ammoniacal liquor and thus reduce the corrosive effect of the said ammoniacal liquor in the said evaporator plant.

Industry Trade Marks

The following trade marks were published in the Official Gazette of the U.S. Patent Office in compliance with section 12 (a) of the Trademark Act of 1946. Notice of opposition under section 13 may be filed within 30 days of publication in the Gazette. (See Rules 20.1 to 20.5.) As provided by Section 31 of the act, a fee of \$25 must accompany each notice of opposition.

Korlan, in capital letters, for organic phosphorus compound for use principally as an active ingredient in parasiticidal compositions. Filed Aug. 1, 1957, by The Dow Chemical Co., Midland, Mich. First use March 12, 1957.

Design, featuring large N plus N on a black and gray background, with large black lettered Southern on top and large black lettered Nitrogen on bottom, for fertilizer. Filed by Southern Nitrogen Co., Inc., Savannah, Ga., Oct. 17, 1956. First use Sept. 4, 1956.

H-11D, in capital letters, for liquid preparation for application to plants, seeds, etc., for promotion of growth. Filed Sept. 5, 1957 by Cerbini Research Corp., New York. First use Aug. 2, 1957.

Florida Reports Fertilizer Sales Tonnage for August

TALLAHASSEE, FLA.—Fertilizer materials sold in Florida during August totaled 67,551 tons, reports Nathan Mayo, commissioner of the state Department of Agriculture.

Total mixed fertilizer tonnage was 33,734 tons.

Most popular material was ammonium nitrate with 1,487 tons, followed by raw phosphates with 1,224 tons.

Most popular grades were 4-7-5 with 4,369 tons, and 6-6-6 with 3,960 tons.

Missouri Bulk Fertilizer Sales in 50% Annual Jump

COLUMBIA, MO.—Bulk fertilizer materials use in this state increased about 50% in each of the past several years, reports W. L. Baker, supervisor of the fertilizer inspection service at the University of Missouri.

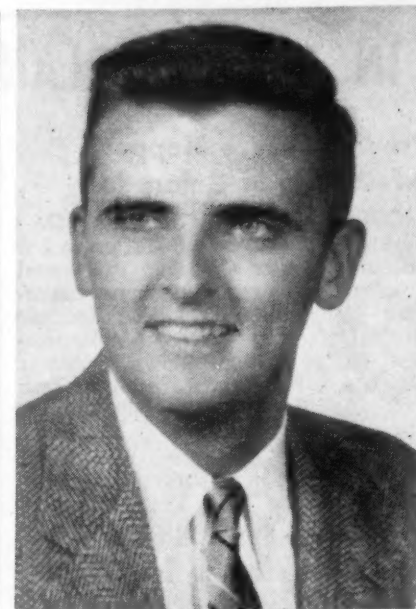
According to Mr. Baker, the first six months of 1958 showed approximately 30,000 tons of bulk fertilizer sold, compared to 23,000 tons for all of 1956.

Bulk sales amounted to 40,000 tons in 1957, he noted.

CSMA's Meeting Theme

NEW YORK—"After you spend money making the product, will your label permit you to sell it?" will be the special theme of the 45th annual meeting of the Chemical Specialties Manufacturers Assn., to be held Dec. 8-10 at the Hotel Commodore here, it was announced.

Among the highlights of the meeting will be election of officers for 1959, presentation of awards in the annual Aerosol Package Contest, and



Tom Morrison

Tom Morrison Joins Staff Of Philipp Brothers

NEW YORK—Tom Morrison has joined the agricultural division of Philipp Brothers Chemicals, Inc., announced his father, Kenneth D. Morrison, vice president.

Tom Morrison, who will work in a sales capacity, was recently released from the army. Prior to his hitch in the service, he worked in fertilizer production operations.

presentation of the annual achievement award.

General meeting speakers include Osgood V. Tracy, Fred C. Foy, Dr. Leroy F. Burney, George P. Larrick, Dr. Leona Baumgartner, and Dr. Justice C. Ward.

Granular Sizes of Fertilizers Tested for Effect on Wheat Responses to Phosphorus

STATE COLLEGE, MISS.—A comparison of four fertilizers, each granulated in three different sizes, was conducted recently in a study of response of wheat forage to phosphorus. The tests are described by J. L. Anthony and J. D. Lancaster of the Mississippi Agricultural Experiment Station staff in the September issue of "Mississippi Farm Research."

The authors said that the fertilizers used in the experiments were:

(1) 7-14-14, formulated with dicalcium phosphate having about 7% water solubility.

(2) 6-12-12, ammoniated ordinary superphosphate, 25% water soluble.

(3) 10-20-20, ammoniated concentrated superphosphate, 50% water soluble.

(4) 11-22-22, diammonium phosphate, 100% water soluble.

Granule sizes were large (-6+14 mesh), medium (-14+35) and small (-35).

Tests were conducted at two locations, one at the Brown Loam Branch Station, Raymond, Mississippi, on Calloway Silt loam soil pH 6.2, the other at the Black Belt Branch Station, Brooksville, on Houston Clay pH 7.2. The available soil phosphorus was low at both locations, according to soil tests.

Seed and fertilizers were banded together in drills spaced 20 inches apart, the authors state. The fertilizers were applied at the rate of 15 lb. N, 30 lb. P₂O₅, and 30 lb. K₂O an acre, respectively. An additional 60 lb. N was top-dressed in mid-winter prior to early spring clipping.

During a three-year period three varieties of wheat (Atlas 66, Chancellor and Coastal) were used as the test crops. The average planting dates were Sept. 25 at Raymond and

Oct. 16 at Brookville. The average harvest date was about March 10.

Early growth responses of wheat forage under field conditions increased with small granule sizes of the low water soluble fertilizers (7-14-14 dicalcium phosphate) but there was little or no difference in response of wheat forage to small granule sizes of the high water-soluble fertilizer.

Results further indicate that fertilizers having a low water-soluble phosphorus content should be granulated more finely than those having a high content of water soluble phosphorus.

The 6-12-12 fertilizer (about 25% water soluble) formulated with ammoniated ordinary superphosphate yielded the least wheat forage. The 10-20-20 formulated with concentrated superphosphate (about 50% water soluble) out-yielded the 6-12-12 but was slightly inferior to diammonium phosphate, a material having about 100% of its phosphorus in a water-soluble form.

The 7-14-14 fertilizer, a mixture of dicalcium phosphate (a very low water-soluble phosphate), ammonia sulphate, and muriate of potash proved to be a good source of phosphatic fertilizer. Yield produced by this fertilizer was slightly superior to highly ammoniated superphosphate (6-12-12) even at the larger granule size, and almost equalled yields produced by diammonium phosphate when the small granules (-35 mesh) were employed.

Phosphorus uptake by the wheat forage was closely correlated with yields. Analysis of samples taken from Raymond in 1956 showed that in general forage from the highest yielding plots had the highest percentage of phosphate.

INSECT AND PLANT DISEASE NOTES

Predict Severe Hopper Infestation in Colorado

COLORADO SPRINGS, COLO.—Severe grasshopper infestation in 8½ million acres of Colorado range and cropland was predicted for next summer by Gordon Mickle, Colorado State University extension entomologist. The prediction follows a summer which saw hoppers swarming eastern Colorado in the worse blight in 20 years.

Mr. Mickle said the 1959 threat was reflected in a survey just completed by the U.S. Department of Agriculture's plant pest control division.

Despite extensive spraying this year, Mr. Mickle said time and money did not permit coverage of all infested areas. Infestation will be threatening 5,167,000 acres of range-land, and 3,520,000 acres of cropland next year. Poisoned bait is being used in Eastern Colorado and aerial spraying is being continued on a limited basis, he said.

Pink Bollworm Discovery Prompts Agent's Warning

LITTLE ROCK, ARK.—The pink bollworm is beginning to threaten Arkansas cotton and farmers must take measures to prevent the spread of this pest, warns Grover C. Dowell, extension entomologist.

Small local infestations of the pink bollworm were found in several southwest Arkansas counties, and now there is a possible danger that migrant laborers might be bringing this insect from Mexico and Texas, where the infestations have been heavy this year.

Arkansas State Plant Board and the Plant Pest Control Division of the U.S. Department of Agriculture have been picking up large numbers of pink bollworm larvae at their regular quarantine stations.

The insect has been found on vehicles, suitcases, and bedding of some of the laborers entering the state, Mr. Dowell said.

Bollworms, Woolly Worms Still Harming Arizona Cotton

PHOENIX, ARIZ.—Cotton insects are still causing damage in some parts of the state. Cotton picking is in progress in practically all parts of the state now, but some insect injury can be expected, especially in Maricopa, Pinal and Yuma counties. Bollworms could also damage cotton in practically all parts of the state.

In Graham County, bollworms are still numerous and stink bugs are very much in evidence. More than 400 bales of cotton have been ginned to date. Verticillium wilt is still quite heavy, but will not affect the yield since it showed up late.

Control measures continue to work well for control of bollworms and woolly worms in Yuma County. The leaf perforator count is down in this county.

Insects continue to menace cotton in all areas of Maricopa County. The insects causing the greatest damage are woolly worms and bollworms.—J. N. Roney.

New Aphid Alerts California Entomologists

HALF MOON BAY, CAL.—A new type of aphid has been discovered here and is damaging brussel sprouts in the South San Mateo County coastside area, it has been reported by Hank Sciaroni, chief county farm advisor.

W. H. Lange, entomologist at the University of California, has identified the aphid as the green peach aphid. Mr. Lange said that the aphid has not previously been a problem

BEETLE BATTLE

FRANKFORT, KY.—The Japanese beetle, currently making enemies in the eastern part of the state, is in line for a rude awakening. Governor Chandler has granted \$8,000 from the state's emergency fund to be used by the University of Kentucky's Agricultural Experiment Station in the battle. The money will be used to buy insecticides and the station will supply the technical advice and the labor, a spokesman said.

with sprouts, but it is difficult to kill.

It is hard to dust the plant effectively with poison to kill the pest, he reports. The University has begun a research and testing program to work on the development of a poison which will be more effective in controlling the insect, Mr. Sciaroni reports.

Second Generation Hoppers Create Problem in Kansas

MANHATTAN, KANSAS—An area in southwest Kansas where hailed wheat before harvest resulted in early volunteer wheat, has a problem with second generation migratory grasshoppers. Most of these grasshoppers have their wings and are scattering through grain sorghum and wheat fields. Occasional fields, where weeds were not kept under control on summer fallow ground, have immature and adult grasshoppers in the newly seed wheat. The adult grasshoppers move to weedy margins for protection at night so spraying and baiting of field margins should be in progress. If hot windy days continue, baiting and spraying will be needed for some time. Flights of these migratory grasshoppers are in progress so that some areas may develop a grasshopper problem where none had existed before. Counts of grasshoppers in Meade, Haskell and Seward stubble fields are as high as 25 per sq. yd. Counts in western and northwest Kansas are much lower than in southwest Kansas.

Corn earworms can be found in most of the immature sorghum fields in southwest Kansas but numbers are usually less than one worm to four plants. Sprayed fields show excellent control of corn earworm and grasshoppers but grasshoppers reinfested the fields after a few days.

Nigra Scale Under Control, But What Accomplished It?

SAN FRANCISCO—The nigra scale, one of the worst pests attacking woody ornamental plants in California during the late 1930's, is now being investigated by a University of California scientist, because it is fast disappearing.

Stanley E. Flanders, professor of biological control at Riverside, would like information on what happened to the nigra scale. When the plant pest was an acute problem in the 30's, University scientists imported and distributed three parasites—all natural enemies of the scale—from Africa. Control of the pest was rapid and complete.

But the question has never been answered: Which parasite keeps the scale under control? It is important to determine which is holding the pest in check, Mr. Flanders believes.

Farm advisors, nurserymen, agricultural commissioners and others who deal with plants encountering specimens of the scale, are urged to notify Mr. Flanders, care of the Department of Biological Control, University of California, Riverside.

Too Much Rain in South Threatens Good Cotton Crop

MEMPHIS—Mid-South farmers are hoping for several days of sunny weather after a two-day deluge of rain halted harvest operations in their tracks.

With some Mid-South cities recording as much as 13 inches of rain in 48 hours, and with water standing waist deep in many soybean and cotton fields, some damage is inevitable. But most farmers agree that the weather for the next few days will be the major factor in determining the loss.

Before the rains came, cotton har-

vest was in full swing in many counties in Mississippi, Arkansas and Tennessee and scattered fields were being picked in Missouri. Many county agents in the four states report that boll rot is beginning to be a factor because of the rank growth. Several county agents and farm store managers said they expected a sizeable increase in cotton defoliation this season to help reduce the threat of boll rot.

Last week's rains also played havoc with those farmers preparing land for fall seeding of small grain. W. T. Smith, Prentiss County, Mississippi, county agent, reported that the weather had slowed harvesting of winter cover crops and grazing crops. However, Mr. Smith said that both corn and soybean crops are excellent.

Need for 'Inside' Boll Weevil Information Leads to Oklahoma State University Study

STILLWATER, OKLA.—Dr. D. E. Bryan, feels that scientists do not know all there is to know about the cotton boll weevil and that is the reason that Oklahoma State University is presently trying to unearth some of the unknown secrets of the insect through a study of its internal structure.

Dr. Bryan, who is associate professor of entomology at Oklahoma State, said, "The boll weevil has been feeding on American farmers' cotton for at least 50 years, but few research men have attempted a detailed study of this insect. Most research into the boll weevil problem has been aimed at better insecticides and other improved management methods."

The boll weevil in some sections now is showing resistance to some toxicants.

Dr. Bryan believes that although research men undoubtedly can devise new and potent poisons on the basis of what already is known about the boll weevil, the time is ripe for some new knowledge about the insect.

Detailed study of the boll weevil is complicated by the fact that the insect wears its skeleton on the outside. Examination of the boll weevil by microscope requires that a specimen, imbedded in a block of paraffin, be cut into slices 1/30,000 inch thick. The hard skeleton of the boll weevil resists such treatment, which is the main reason few scientists have attempted the research underway at OSU. Dr. Bryan is trying various chemicals in an effort to soften the hard coating.

The aim is to know how the boll

weevil is put together, where its various organs and glands are located and how they are supported, and the form of its various life systems. The research is of a basic nature.

"In basic research, you never know what will turn up," Dr. Bryan says. Speculating a bit, he says that the study may yield clues as to how the boll weevil develops resistance to an insecticide, which would open up new lines of attack for the scientists who develop insecticides. Another possibility is that knowledge gained through the study of the boll weevil can be utilized in study of other insects.

380 California Commercial Fertilizer Firms Registered

SAN FRANCISCO—As of Sept. 15, some 380 firms were listed in California as commercial fertilizer registrants for the current fiscal year ending next June 30, reports W. C. Jacobsen, director of the Bureau of Chemistry of the State Department of Agriculture, as of Sept. 15. The number is likely to go beyond 400 before the fiscal year ends as additional firms register later in the year, Mr. Jacobsen said.

As of the same date, 154 firms were registered to sell agricultural minerals in the state, and 11 additional firms were classified as jobbers.

Forty-five companies are registered to sell auxiliary plant chemicals. These figures include separate branches of the same firms located at different addresses, and in a number of cases the same company is listed within several classifications.

VIRGINIA LAW

(Continued from page 1)

tachlor a ton will be allowed in 0-15-30; 0-20-40; and 0-30-30 on alfalfa.

"The addition of an insecticide to a fertilizer makes the mixture an economic poison under the Virginia Insecticide, Fungicide and Rodenticide law, and necessitates registration under that law, in addition to registration as a fertilizer," Mr. Berry commented. "Registration procedure will be simplified, since both of these laws are enforced by the Division of Chemistry and Foods," he added.

Each manufacturer's brand and grade containing either aldrin or heptachlor must be registered separately as a fertilizer and as an economic poison, subject to all provisions of both laws, the announcement says.

To register and distribute these products in Virginia, the following procedures must be followed, Mr. Berry points out.

Mixed products must be packaged and distributed only in tight containers, such as multiple wall paper bags or fiber drums, he says, and labels must include:

1. Contents of label for Pesticide In-

gredients, Directions and Caution statement.

(a) Pesticide ingredient statement

(1) Active Ingredients

(Aldrin 8 lb. per ton)

Hexachloro - hexahy -

d r o - dimethano -

naphthalene 0.38%

Related Compounds .. 0.06%

Inert Ingredients 99.56%

(2) Active Ingredients

(Heptachlor 8 lb. per ton)

Heptachlor* 0.40%

Related Compounds .. 0.15%

Inert Ingredients 99.45%

*Heptachloro 4,7-methanotetrahydroindene

(3) Active Ingredients

(Heptachlor 4 lb. per ton)

Heptachlor* 0.20%

Related Compounds .. 0.08%

Inert Ingredients 99.72%

*Heptachloro 4,7-methanotetrahydroindene

(b) Directions for use.

(1) For Corn. For the control of

Southern Corn Root Worm, Seed Corn Maggot, and Wireworms on corn, this material should be applied through fertilizer applying equipment at the rate of 500 lb. to the acre when broadcast and worked into the soil just prior to planting, or at the rate of 250 lb. to the acre in the row at the time of planting.

- (2) For Peanuts. For the control of Southern Corn Root Worm on Peanuts, this material should be applied through fertilizer applying equipment at the rate of 500 lb. to the acre when broadcast and worked into the soil just prior to planting, or immediately before the first cultivation.

- (3) (For alfalfa when fertilizer grade contains 4 lb. Heptachlor per ton)

For Alfalfa. For the control of the Alfalfa Weevil on alfalfa, this material should be applied broadcast on the surface of the soil about the last week in February or the first week in March through fertilizer application equipment at the rate of 500 to 1,000 lb. to the acre. Do not apply within 15 days of harvesting or pasturing.

- (4) (For alfalfa when fertilizer grade contains 8 lb. Heptachlor per ton)

For Alfalfa. For the control of the Alfalfa Weevil on alfalfa, this material should be applied broadcast on the surface of the soil about the last week in February or the first week in March through fertilizer application equipment at the rate of 300 to 500 lb. to the acre. Do not apply within 15 days of harvesting or pasturing.

(c) Caution statement.

- (1) Hazardous if swallowed, inhaled or absorbed through the skin. Do not get in eyes. Wash thoroughly with soap and water after handling. Keep away from children and domestic animals. Do not contaminate feed or food-stuffs. To protect fish and wildlife, do not use where run off will contaminate streams, lakes or ponds. This fertilizer contains added _____* and is intended for use only on soils at rates recommended in directions on this package. Its use contrary to the instructions printed on this package may result in serious injury to soils and crops.

*Insert Aldrin or Heptachlor, whichever is applicable.

2. All labeling for Fertilizer-Aldrin or Heptachlor mixtures shall conform with one or more of the following procedures: (Any labels approved for registration in 1958 will be acceptable for 1959.)

Procedure 1:

This labeling shall be followed when the guaranteed analysis, directions and caution statements are combined in one label. This must be printed on the bag or printed on a label approximately 8" x 10" which must be glued or pasted on the bag. The print size requirements for this label are as follows:

(a) The print size for "words in the brand name" and "numerals in grade" shall not be less than ½ inch.

(b) The print size for the wording "Fertilizer With Aldrin" or "Fertilizer With Heptachlor" and "Caution" shall not be less than ¼ inch.

(c) The print size for the wording "Guaranteed Analysis," including guaranteed analysis statement, and "Caution Statement" shall not be less than ¼ inch.

Procedure 2:

This labeling may be followed when the fertilizer brand name and guaranteed analysis statement is printed on the bag in the required form for commercial fertilizer. There are several possible variations of this labeling as follows:

(a) If the words "With Aldrin" or

"With Heptachlor," whichever is applicable, appear on the bag immediately following the brand name of the fertilizer and in print size of not less than one inch in height, the labeling may appear on a label of 3" x 5" size or larger and must be glued or pasted on the bag directly above or below the fertilizer guaranteed analysis statement. The print size for the words "Fertilizer With Aldrin" or "Fertilizer With Heptachlor" and "Caution" shall not be less than ¼ inch and under Directions the words giving the name of crop shall be in bold print or in larger print than the wording of directions. There shall be no restrictions on print size of other wording, except it shall be plainly legible.

(b) If the words "With Aldrin" or "With Heptachlor" do not appear on the bag immediately following the brand name, then the labeling shall appear on a label of 6" x 8" size or larger and must be placed on the bag directly above or below the fertilizer

guaranteed analysis statement. The print size for the words "Fertilizer With Aldrin" or "Fertilizer With Heptachlor" shall be ½ inch and the word "Caution" shall be ¼ inch. The words giving the name of crop under Directions shall be in bold print or in larger print than the wording of directions. There shall be no restrictions on print size of other wording, except it shall plainly legible.

Procedure 3:

It will be permissible for a tag or gummed label showing directions for use of fertilizer-pesticide mixture to be attached to bag separate from any other labeling, such as brand name, guaranteed analysis of fertilizer and pesticide and caution statements whether or not the words "With Aldrin" or "With Heptachlor" appear on the bag immediately following the brand name of the fertilizer.

(a) The Analysis Label shall appear on a label of 3" x 5" size or larger and the print size for the

words "Fertilizer With Aldrin" or "Fertilizer With Heptachlor" and "Caution" shall not be less than ¼ in. This labeling may be printed on bag in same form and order. There shall be no other restrictions on print size of other wording, except it shall be plainly legible. This label shall be placed or printed on the bag directly below the fertilizer guaranteed analysis statement.

(b) The Direction Label shall appear on a tag or gummed label of 2½" x 4½" size or larger and may be attached to the top end of bag or glued or pasted on label side of bag, but not over other required information. The words "Fertilizer With Aldrin" or "Fertilizer With Heptachlor" shall be in print size of not less than ¼ inch. The words giving the name of crop under Directions shall be in bold print or in print larger than the wording of directions. There shall be no restrictions on print size of other wording, except it shall be plainly legible.

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Herbicides Face Big Challenge As Weed Populations Increase

By L. H. Shebeski and G. Friesen*
Division of Plant Science, University of Manitoba
Winnipeg, Manitoba, Canada

INTEREST in new chemicals, or for that matter interest in any chemical for weed control, is directly related to the extent of the weed problem. It would be pointless to review the new chemicals in weed control without relating the chemicals to the weeds they may control and to the crops in which control may be effective.

The seriousness and the extent of the weed problem in human affairs have been impressed on all of us at one time or another. We know that in the United States and in Canada weeds are quite common on the over 400 million acres utilized as cropland and on the over billion acres in range and pasture land. I would not wish to speculate as to how much of this immense land area will eventually be

sprayed for weed control. In fact, I do not think that the question can be answered until much more is known as to the extent of the losses caused by weeds and on the economic effectiveness of chemical weed control—acre by acre.

In the division of plant science at the University of Manitoba, we have been particularly interested in assessing crop losses and have carried out a variety of weed competition studies since 1952. We have established that for a strong competitor like wild mustard, as few as 10 plants per square yard in flax, 25 in oats and 50 in wheat and barley are sufficient to cause significant crop losses. Once there are from 100 to 200 weeds per square yard, we have found, a fur-

ther increase in weed population is relatively unimportant.

These figures would be of only academic interest unless we knew something about the density of weed growth in farm fields. During the last three years we have carried out a survey on crop losses in farm fields in a radius of 60 miles of Winnipeg and also made spot checks on the numbers of weeds per square yard in other areas of the Province. We found an average of approximately, 250 weeds a square yard with at least 90% of the fields examined having weed counts greater than 50 weeds per square yard. In other words, we can assume significant crop losses are occurring in at least 90% of the fields.

Some weeds, however, are not seri-

ous competitors. In discussing chemical weed control we should know what are the predominant species of weeds, because in actual practice chemical weed control cannot be divorced from weed and crop species. Although in our survey we found more than 30 weed species with at least 15 species present in most fields, the six major species were wild mustard (100% of the fields), wild buckwheat (98%), lambsquarters (97%), wild oats (93%), red root pigweed (92%) and green foxtail (86% of the fields).

It may be of interest to note that even though there has been widespread use of 2,4-D in the Red River Valley for the past 10 years, and wild mustard is very easy to kill, it is still a major weed with us. On the basis of our experience with this one weed alone, there should be an intensification of the use of 2,4-D or MCP rather than any expectation of a decline. It is also interesting to note that on all farm fields examined there was an admixture of weeds and that two of the six predominant weeds, wild oats and green foxtail are not controlled by 2,4-D or MCP and that another two, red root pigweed and wild buckwheat, are very difficult to control.

One other fact worthy of note emanating out of weed competition studies is the speed with which the full competitive effect of weeds takes place. It takes less than a week's growth to change from no loss to the total loss possible by the given weed population. We found that when weeds and crops emerge at approximately the same time, competition starts to take place with wheat, oats or barley when these crops are anywhere from the 4 to 6-leaf stage depending on the season and severity of the weed infestation. Hence spraying to be effective should destroy the weeds by the time the crop is in the 4-leaf stage. Weed killing at a later stage, although useful from the standpoint of reducing weed seed populations, may not be financially beneficial in the year of spraying.

So much for the weed problem. I would now like to review briefly some of the newer herbicides as we know them here—but frankly, I do not know when a "new" chemical ceases being considered "new." For the sake of convenience I will discuss the chemicals by groupings:

1. Phenoxy Group

Since the advent of 2,4-D and allied chemicals a large number of phenoxy type herbicides have been evaluated. The butyries (i.e. 2,4-DB and MCPB) are finding an important place for weed control in legumes. The National Weed Committee (Western Section) is tentatively recommending their use in seedling alfalfa and clovers. MCPB or CMPP (a propionic acid derivative) is now registered for use in the United Kingdom for the control of goose-grass and chickweed in cereal crops. Its potential usefulness in Western Canada is still highly speculative since only limited experimental data is available.

2. Other Acids

The benzoic acids (2,3,6-TBA and 2,3,5,6-TBA) are registered in the United States and indications are that these herbicides may find an important place in the control of deep-rooted perennial weeds. Fisons CP-1815, a mixture of benzoic and cresoxyacetic acids, has been found to be particularly effective on wild buckwheat, ladies thumb, corn spurry and certain perennials. From experiments conducted by the University of Manitoba in 1958, it would appear that CP-1815 is also quite effective on field horsetail.

Diast weed killer, a mixture of

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*Paper presented at Canadian Agricultural Chemicals Assn. meeting, Winnipeg, Man., Sept. 17, 1958.

2,4-D and citric acid, in several experimental trials, has given good control of wild buckwheat with two 5-oz. applications.

3. Carbamates and Thiocarbamates

In this group EPTC (Eptam) is one of the new outstanding herbicides and should find wide use as a selective weed control chemical in pre-planting or pre-emergence treatments. At the University of Manitoba we have obtained excellent control of weeds such as wild oats, lambsquarters, pigweeds, and green foxtail in flax, sugar beets, corn, and transplanted tomatoes.

4. Acetamides

CDAA (Randox) is now registered as a selective grass herbicide in Canada and is finding an important place for the control of foxtail species in corn and soybeans in Eastern Canada. A newer formulation CDAA-T appears to be more effective under Western Canadian conditions but is still considered an experimental chemical.

5. Triozimes

Simazin was released for experimental work in 1956. Experimental work showed it to be outstanding for the control of many weed species, both grasses and broad-leaved in corn, but its residual characteristics in Western Canada may limit its usefulness. Already new and apparently more effective analogues are being tested. One of these, G-30027, was particularly outstanding in our trials this year.

6. Substituted Ureas

Fenuron, Monuron and Diuron are too well known to require specific mention but a new substituted urea—Neburon has recently been registered for sale in Canada. This herbicide is recommended for weed control in evergreen nursery plantings, and also shows promise for the control of mouse-eared chickweed in lawns and tartary buckwheat in cereal crops. Further testing is necessary before general recommendations will be formulated.

7. Amitrol (Amino Triazole)

Although Amitrol has been on the market for several years, it is considered a new herbicide since it is undergoing evaluation by many investigators. Amitrol appears to be effective against Canada Thistle, Couch Grass, and possibly other perennial weeds when treatment is combined with cultivations in a summer-fallow year. The timing and types of cultivations necessary are under study. Amitrol is a very effective herbicide for the control of poison ivy and cattails.

8. Mixtures

Recent newcomers to the field of soil sterilants have been mixtures of various weed killing chemicals. The objective has been to reduce the rates required and over-all cost per acre and/or to alter the soil residual characteristics. Some of the more recent mixtures are: Chlorea (sodium chlorate—borate—monuron); Urox (monuron—TCA); Garlon (Silvex—Dalapon); Drilane and Calmix Tad (2,4-D—Dalapon); Ureabor and Nalco-H-174 (monuron—borate); Stachlor (TCA—sodium chlorate); DB granular (2,4-D—borate); Calmix "Maintenance" (monuron—Dalapon—2,4-D) etc.

Simazin is the only newcomer to this field and already it is being mixed with other herbicides for soil sterilization purposes.

9. Soil Fumigants

Historically, this is not a new approach to chemical weed control. Carbon bisulfide and chloropierin have been used for many years. These are now being replaced by such fumigants as Methyl bromide, Mylone, Vapam, and Allyl alcohol. The high cost and difficulty of application limit their usefulness. Dr. C. J. Willard, Ohio State University,

writing in the Agronomy Journal makes the following comment: "The manufacturer who develops a quick-acting soil sterilant which will kill seeds, plants and roots in the soil and disappears in a short time, and which can be used at a cost compatible with field use, will reap a fortune."

10. Wild Oat Control Herbicides

In recent years many experimental herbicides have been released to research workers for possible wild oat control in cereal crops. Most of these chemicals are designated by code numbers, and have possibilities as pre-planting or pre-emergence treatments. One of the new chemicals, S-847, tested for the first time this year, is of particular interest in wheat and barley post-emergence treatment. From the standpoint of farmer acceptance as a post-emergence herbicide it would be preferable to pre-planting or pre-emergence treatments. It is too early to draw definite conclusions on even the most promising of these chemicals.

Personally, I am very optimistic that we will soon be able to recommend to farmers on the 61 million acres of wild oat infested land in the Great Plains area a reasonably priced wild oat control chemical. Certainly, such a chemical is sorely needed.

Before closing I would like to say a few words concerning the problems facing us in the future and will preface these remarks with a quotation from a paper by Dr. Minarik presented at a recent North Central Weed Control Conference. Dr. Minarik said: "I think that the people whose job it is to direct herbicide synthesis and screening programs have one of the most fascinating jobs I know of. There is such a broad field to cover, one can let his imagination run wild and he is sure to come up with something of value in short order. The relatively large number of new herbicides that have been developed in recent years attest to this fact."

But let us not forget that the wide range usefulness of any new weed control chemical is directly related to the range of distribution of the specific weeds that the chemical will control in crop land.

We do not have a satisfactory picture of the distribution of the various species of weeds across Canada and as evidence of this lack of knowledge, I would refer to the work of

Dr. Coupland at Saskatoon whose surveys on Toad Flax revealed large acreages of this weed in many parts of Saskatchewan where the weed was not believed to be present. Neither do we have sufficient data on the competitive effect of the different weed species. For example in our recent competition studies we were frankly surprised to find how little reduction was caused in cereal grains by green foxtail when compared with comparable numbers of wild oats, wild mustard or wild buckwheat in the same crops.

NPFI Sponsors Soil Fertility Program To Aid South Carolina Crop Production

WASHINGTON — An intensified soil fertility program, based on soil testing and aimed at encouraging more efficient crop production by farmers through the proper use of lime and fertilizer, has been launched in Edgefield County, S.C.

The program is being supported by a \$3,500 grant from the National Plant Food Institute and is being carried out by the South Carolina Agricultural Extension Service and Experiment Station.

A kick-off banquet to get the program started was held in Harmony Grove Community Center of Edgefield County in late August. About 80 farmers, county businessmen and agricultural workers attended the inaugural session.

In outlining the purpose of the program, O. W. Lloyd, local county agent, and George B. Nutt, director of the South Carolina Extension Service, pointed out that farmers in Edgefield County could boost their income by \$2.5 million, simply by following soil test recommendations. The \$2.5 million figure, it was added, does not include potential increased profits from horticultural crops or milk production.

Mr. Nutt also indicated that the concentrated pilot project would be expanded in the future to include other counties in South Carolina, provided the current undertaking proves successful.

Samuel L. Tisdale, Southeastern NPFI regional director, discussed the important role soil testing plays in a sound soil fertility program, and its relationship to efficient crop production at the kick-off banquet.

"Lowering unit production costs is

It is this type of information which should be of importance in determining the types of new chemicals that are most needed. Therefore, in conclusion, I would suggest that the weed chemical industry should benefit greatly from a thorough survey of weed species and populations on the crop lands of Canada and from studies on the competitive ability of the more dominant species. The extent to which new weed control chemicals will be marketed cannot be divorced from the distribution and seriousness of the weeds they control.

highly significant," Mr. Tisdale emphasized, "because it will make it possible for South Carolina farmers to compete more readily under today's market conditions."

Dr. H. P. Cooper, dean emeritus of agriculture, discussed the value of lime in Southeastern agriculture, while Dr. J. H. Allbritten, head of the soil testing laboratory at Clemson University, reviewed the operations of the laboratory and pointed out the services which it could render to South Carolina farmers. A question and answer session was led by Hugh Woodle, extension agronomist.

Plans for the intensified project in Edgefield County, according to Mr. Lloyd, call for sampling soils in every field throughout the county. Soil tests of all samples will be analyzed at the Clemson laboratory, with Mr. Lloyd and his assistant agents outlining the lime and fertilizer recommendations for each field as indicated by the tests.

A concerted effort will be made to get farmers to follow the fertilizer and lime practices suggested, and all segments of the community are being urged to support the program.

On Soil Service Staff

NEW YORK—Charles T. Claxton has been added to the staff of the soil service division of the American Agricultural Chemical Co., O. C. Leetun of the service division announced. Mr. Claxton is working on his master's degree from Virginia Polytechnic Institute. As a member of Agrico's staff of agronomists, he will interpret soil reports and make fertilizer recommendations, Mr. Leetun said.



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THEY CAN ALSO BE USED FOR
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WORLD REPORT

By **GEORGE E. SWARBRECK**
CROPLIFE Canadian and Overseas Editor

Just as the alchemists of old searched for the elixir, so the agricultural chemists keep searching for the perfect insecticide. What would be perfection in their field? There is no hesitancy about the answer. They want to find, the chemists say, a substance which once fed to plants would kill all insects that feed thereon thereafter. This, they claim, would be the ideal method of insect control.

Is such an objective impossible of attainment? There are few, in this age of nuclear marvels, who will be prepared to answer with a definite negative. On the other hand, the discovery or invention of such a perfect weapon against insect infestation is unlikely in the light of present knowledge, the experts declare.

Yet scientists working on systemic insecticides have made some important breakthroughs. Right now, the Canadians are excited about new chemicals intended primarily for controlling warble grubs in beef cattle—a serious problem for some farmers. Warble damage can cost farmers from \$5 to \$25 a head as a result of meat loss and hide damage.

R. H. Painter, federal livestock insect liaison officer in the Canadian government's agricultural department, has been demonstrating the application of the new spray type systemic.

How It Works

Applied to an animal's body the material penetrates the skin, enters the bloodstream and is distributed throughout the body. In this manner, it comes in contact with and destroys cattle grub larvae, wherever they are located within the animal, whether in migration through the muscle, or in the gullet, pharynx, esophagus, or elsewhere.

In addition to the systemic action, the spray application provides contact effect. A large percentage of the material persists on the hair of the animal where it provides residual control of lice, flies and ticks.

In order to evaluate the chemical, Mr. Painter recently sprayed 96 head of cattle and left about the same number untreated. Next spring, he proposes to investigate the results.

Peruvian Factory

The first factory in Peru to manufacture fertilizers is expected to go into production at the end of this year. Initially the annual output will be 25,000 tons of ammonium nitrate for agricultural purposes, 5,000 tons of ammonium nitrate for industrial purposes, 1,500 tons of nitric acid for explosives, 15,000 tons of sulfate of ammonia for agriculture and up to 1,000 tons of anhydrous ammonia.

The factory has been so designed that it can double its capacity if the demand justifies expansion. And agricultural observers in Peru think that expansion will be justified within five years, such is the interest in fertilizer evinced by the Peruvian farmers.

Fertilizer Plant Planned for Iraq

The government of Iraq is asking firms to tender for the engineering, supply, erection and commissioning of a fertilizer plant having a capacity of 250,000 tons of ammonium sulfate and 21,000 tons sulfuric acid a year. Tenders must be submitted to the Ministry of Development, D.G. Legal Affairs and Contracts, Baghdad by Dec. 15, 1958.

More detailed information of the

requirements can be obtained by applying to the Embassy of Iraq, 2315 Wyoming Ave., N.W., Washington, D.C.

Korean Plants

Korea's Ministry of Industry and Commerce reports that a plant with a potential productive capacity of 85,000 tons of fertilizers a year is almost completed.

Now investigations are being pressed ahead for the construction of another plant in the southern part of the country. Geological surveys of suggested sites are proceeding. Officials say that the plant will produce both urea and mixed fertilizers.

The source of financing is not yet clear, but it is understood that Korean officials are hopeful that the U.S. taxpayer, through the medium of the International Cooperation Administration, will foot the bill. If not, the U.S. Development Loan Fund will be asked for aid.

Korea as Importer

Korea is an important user of imported fertilizers—paid for by ICA. Some of the requirements come from Japan, but other countries, notably Germany, have participated in the business in the past.

The government controls the importation of all fertilizer, or nearly all, and is reluctant to allow private firms to take a hand, because availability falls considerably short of requirements. The minister of agriculture and forestry, Byung Yoon Kim, alleges that private importation under existing conditions would result in a rise in the price of fertilizers and this, in turn, would force up grain prices, he says.

Cuba Wants Factory For Fertilizers

The Banco Nacional de Cuba has issued a handbook designed to encourage agricultural and industrial expansion in Cuba.

The publication, entitled "Economic Development Program, Progress Report No. 3," outlines the measures and incentives implementing the policy adopted by the bank to encourage private foreign investment, particularly new investments for agricultural expansion.

The bank says it is prepared to grant credits and loans for the assistance of investors desiring to establish new industry. And among the opportunities the bank reports as existing is one for the establishment of fertilizer production facilities.

Trade Booms in Spain

Spanish farmers have been sold on the value of fertilizers, reports a recent visitor who saw evidence of expansion in fertilizer production.

Nitrogenous fertilizers are mainly in demand and one firm, Nitrates de Castilla S.A., is in the process of acquiring new equipment to jump its current output of 70,000 tons a year to 200,000 in 1962. Several other factories, with expansion plans in the works, will jump collectively from 370,000 tons of nitrogenous fertilizers a year to 690,000 tons.

Japanese Progress

The loss of the fertilizer market in Mainland China was a major blow to the Japanese fertilizer manufacturers. But a collection of smaller buyers is the means of improving the economic health of the industry. Countries in Southeast Asia, in Central and South America and in the

Middle East are showing interest in Japanese offerings.

Formosa recently bought 35,000 metric tons of ammonium sulfate at \$47.80 ton, f.o.b., and 7,000 tons of urea at \$50.24 went to North Vietnam. South Vietnam took 4,800 tons of ammonium sulfate and the Philippines 1,000 tons of urea. Indonesia paid \$50.82 ton for 25,000 tons of ammonium sulfate and the Australians took 2,000 tons of urea at \$106 ton, f.o.b.

Kansas Rodent Damage Is Serious Possibility, Says Control Specialist

MANHATTAN, KANSAS—A possibility of serious damage by rodents is being watched carefully and, if necessary, community control programs will be set up, reported George Halazon, Kansas State College Extension Service.

Rodents in larger numbers than in recent years are infesting fields in areas of central Kansas. Worst infestation is in the southern counties of central Kansas. As the rodents are now in a high reproductive stage they may increase in numbers, Mr. Halazon said.

Mr. Halazon, extension predator and rodent control specialist at K-State, said the major trouble is being caused by the species known as cotton rats. These are more of a southern animal and are usually not as numerous as at present in Kansas. While 6 to 8 in. long when adults, they are not as large as the Norway. The Norway rat and house mice population also has increased.

Mr. Halazon credits the increased rodent population to more food and cover in fields this year and to the inability of predators to get at the rodents. This is occurring along with the normal population fluctuation. As they increase in numbers the rodents may spread over a larger area of the state.

"Perimeter stations baited with anti-coagulants around the outside of farm buildings can help to control these pests," he said.

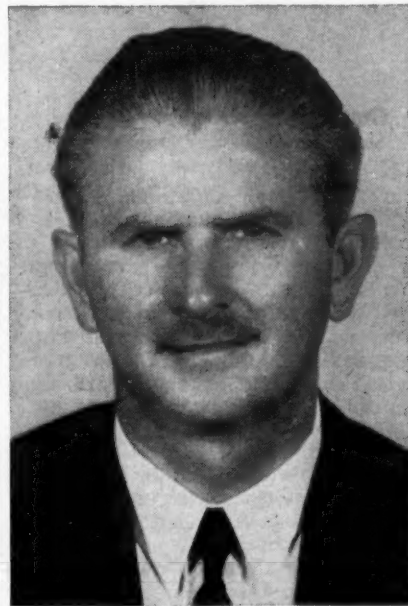
NJDA Plant Surveyors Find No White-Fringed Beetles in State

TRENTON, N.J.—A fifth New Jersey survey for the white-fringed beetle has uncovered no trace of the insect, Frank A. Soraci, director, division of plant industry, State Department of Agriculture, reports. This is the first year since the insect was initially reported in New Jersey that no specimens have been found.

The white-fringed beetle was discovered in a sweet potato field near Vineland in 1954; it had not occurred in New Jersey, nor in any state north of North Carolina, before that date. Damage to the sweet potato plants was so severe that the crop was completely unmarketable. An eradication program was immediately begun and the infestation was limited to about 350 acres.

Since 1954, Mr. Soraci said, intensive surveys have been made each year in the location where the pest was found and in bordering areas. In addition, farm products loading points, railroad terminals and other places where the beetle might gain entry into the state were inspected. Until this year, scouting operations have revealed at least a few white-fringed beetles. This year, not one was found.

Mr. Soraci stated that these results were extremely encouraging, although surveys will be continued for at least two more years. If results are still negative at the end of that time, the beetle can then be definitely considered eradicated from the state. He acknowledged the help and support of federal plant pest control officials, various state agencies, and the growers whose fields were infested, in the eradication effort.



J. Lauren Shopen

SAFETY PANEL MODERATOR — J. Lauren Shopen, safety director for Consumers' Cooperative Assn., Kansas City, Mo., will lead the panel discussion on "Accident Case Histories" when the Fertilizer Section of the National Safety Council meets in Chicago Oct. 20-21. Mr. Shopen has long been prominent in the work of the fertilizer industry safety movement and has handled its publicity program for the past several years. Panelists scheduled to appear on the program include safety engineers from eight fertilizer manufacturing firms. They will describe case histories on the basis of actual experience, and will offer suggestions on accident prevention in the fertilizer industry. All persons involved with fertilizer production are urged to attend the two-day conference. Headquarters will be the LaSalle Hotel, Chicago.

High Winter Wheat Yields Need "Plenty of Nutrients"

CHICAGO — High yields and top profits from winter wheat depend largely on providing the crop with plenty of plant nutrients in quickly available form, according to reports by Midwestern agronomists.

These specialists suggest these methods for supplying the plant food this fall, based on soil tests which indicate what kinds and how much fertilizer to add:

1. On soils with medium or higher fertility levels, row applications of fertilizer at planting time with the grain drill will give good results.

2. If your soil has a low nutrient level, you can often obtain the best results by combining row fertilization with broadcast and plow-down applications of fertilizer. Row fertilization is essential for a quick start. When you can't add enough nutrients with row fertilization, you can broadcast and plow down additional plant food.

The agronomists advise top-dressing the wheat with nitrogen fertilizer next spring, if only small amounts of nitrogen were added this fall.

Other management practices are advisable for profitable wheat production, according to the agronomists. These include: Seeding recommended varieties of treated wheat that are suited to particular areas; using minimum tillage to provide a firm seed bed and conserving water and controlling erosion.

TO PLANT POST

NEW YORK—E. R. Steltzer has been named assistant superintendent at the Cincinnati plant of the American Agricultural Chemical Co., D. S. Parham, vice president in charge of production, announced. At Cincinnati, Mr. Steltzer will be responsible for production under superintendent A. B. Rusche. He was formerly located at the A.A.C. Three Rivers plant at Phoenix, N.Y. K. R. Treiber replaced him at Phoenix.

Personnel Control for Small Marketers

By Daniel J. James

Formerly Professor of Marketing, University of Arkansas

The value of good personnel control in small firms can hardly be overstressed. Efficient employees have meant the difference between success and failure in many small marketing enterprises. But smooth operation requires more than simply hiring an assortment of individuals and "turning them loose to do the best they can."

In the first place, you may have picked the wrong people—unsuited by ability and interest to your particular needs. Then again, your employees may do well enough up to a point, but lack instruction in how to do a really top-notch job. Or finally, a well-chosen and well-informed staff may not turn in its best work because of inadequate day-to-day guidance and direction. Thus, although it can have many refinements, personnel control is made up of three essentials: hiring, training and supervision.

Hiring

Personnel control starts with your search for a new employee. Hiring can be a serious problem for small marketers, but care in selecting the people you hire will pay dividends later. While you may have a waiting list of applicants from which a new employee can be picked, selecting the actual one is full of risks.

1. Sources. Try to get the people you need from the most reliable sources you can. The place to try first is within your existing organization. "Promotion from within" is usually a good general guiding policy. It works best, of course, for permanent jobs and for people above the rank-and-file level.

Contacts made through present employees comprise a second good source. Sometimes excellent prospects are turned up when your own people introduce their friends. Recognize, however, that many times persons being presented will be very like the individuals who bring them around. Also, it is well to decide where you stand on the matter of hiring people who are related to present employees.

Unsolicited applicants for work are a third source. Some managers feel that those who actively seek a position show more initiative than others and probably have a more clearly-defined interest in working for the particular firm they have approached.

Former employees make up a fourth worthwhile source. They have the advantage of knowing how you operate. Frequently, changes in home situations and family responsibilities cause good people to return to you for work. Sometimes this source is particularly useful in finding temporary help for seasonal needs. For best results you need detailed records on former employees who did good work on previous assignments with you.

Schools and colleges constitute a fifth source. As a rule you can expect these institutions to "meet you more than half way" as far as cooperation goes. The people they send you may be less experienced, mature and stable than some. Nevertheless, they will usually bring with them the assets of youth, recent training, adaptability and enthusiasm.

Reciprocal agreements with

other firms may be a valuable sixth source. Its commonest application is probably the case where you have, say, a good sales person who wants and deserves advancement, but cannot be promoted because no opening exists. By prearrangement you notify another similar concern which may be able to offer a suitable job. The other fellow does the same for you when the situation is reversed. Note, however, that in very small firms where there are few openings, this technique often meets with limited success.

In addition to these six sources there are four others which should not be overlooked. Unions are the chief source of employees in some cases. Associations are particularly good in providing leads to executive, scientific, and professional personnel. Employment agencies are of three kinds: public, private and restricted (to specialized or local groups). The types of people they deal with and the effectiveness of their work will vary among different localities. Although advertising is regarded by many managers as a last resort, it can actually produce very good results if the material is worded properly.

2. Interviewing. An old military axiom holds: "There is no substitute for personal reconnaissance." This idea is equally valid in the field of personnel control. Therefore, once you have identified some prospects, you should size them up carefully face-to-face.

This interview should be something more than five minutes or so of small talk. In some businesses, for example, two or more interviews are used along with psychological tests of various kinds. (See chapter 6, "Psychological Testing for Small Business," in *Management Aids for Small Business*, Annual No. 3, available from Superintendent of Documents, Washington 25, D.C. 1957, 45¢). In addition, a detailed application form is usually requested from the applicant. If you don't already have an application form, you can purchase a supply from a publisher of industrial and commercial materials. Many smaller concerns, however, make the mistake of trying to get the information they need through a much less formal procedure. The owner or manager simply talks with the prospect for a few minutes to check generally on past experience, training, appearance, and personality. The applicant may be hired on the spot.

The facts most helpful in providing personnel control at the hiring stage are the applicant's job objectives, social adjustment, education, present occupation, length of time on last job, why he left (or wants to leave) that job, previous work experience, character references, position applied for and, in some cases, salary expected. In collecting and sizing up these facts, you may find it worth the cost to obtain outside professional advice.

The value of asking about expected salary is open to debate. Many employers think that the question has much merit. Others, however, feel that money considerations should wait until later.

3. Investigation. It is almost al-

ways wise to check prospects' backgrounds before offering them jobs. After the interviews are completed the information obtained ought to be investigated. You can make this investigation in any of several ways. The most common procedure is to visit or telephone to former employers and persons given as references and inquire about the experience, ability, and character of the applicant. If you have sufficient time, or the distances involved are great, you may want to make a written investigation by mail. However, it is not nearly so accurate as is calling by long distance telephone.

The information turned up should, of course, be considered with judgment. Try not to accept either criticism or praise without question or evaluation of the individual from whom it comes.

Training

Training is the second major element in personnel control. An impor-

tant element in maintaining high-quality performance on the part of employees is the training you give them. To serve the customers well and, by doing this, to make a profit for your firm, every employee requires special instruction.

The program need not be formal. Learning of one kind or another is going on all the time. Employees learn by themselves or management trains them. In the first case there is little, if any, control. In the second, control can be tight and effective. The advantages of systematic training may be summarized as follows: Shortens the learning process, reduces wage and salary expenses per dollar of sales, improves individual earnings, promotes job security, reduces labor turnover, lessens the need for supervision and builds employee morale.

1. What Kinds of Training? Some small business owners tend to think training is synonymous with education. This, however, is not universally true. Education may be thought of as the effect upon an individual of all of his experience. It is essentially a long-term proposition. Training is a more concentrated process of instruction. (Turn to **PERSONNEL CONTROL**, page 12)

SHOP TALK

OVER THE COUNTER

By Emmet J. Hoffman
Crophile Marketing Editor



One of the sharpest indictments of a situation confronting dealers as well as all other businessmen was issued recently by L. H. Simerl, agricultural economist from the University of Illinois. Dr. Simerl entitles his indictment, "Cruellest Tax Increasing Again." His letter reads:

"Many millions of Americans are paying a heavy, cruel and dangerous tax that has never been authorized by any Congress, state legislature or local tax body.

"It is a heavy tax because it takes up to half of the income of many people.

"It is a cruel tax because it weighs heaviest upon those least able to pay—widows, orphans and older persons who have worked hard to save for their later years.

"It is a dangerous tax because it has toppled democratic governments, bred dictators and led to wars and destruction.

"This tax is inflation.

"Some 15 years ago we were urged to buy U.S. government savings bonds. 'Invest three dollars and get back four.' Many invested—only to find that the four dollars they received brought hardly as much as two of those invested.

"Many persons have invested in life insurance, often at considerable sacrifice in their living standard. Policies bought 15 years or more ago now are worth only half what they were expected to be.

"Older persons who paid into retirement funds for many years now find that they must live in poverty or on charity of one kind or another.

"Inflation helped to crush the South during the Civil War. During the 1920's, inflation in Germany spawned Adolph Hitler and led to World War II.

"Inflation is an excess of demand over supply. Spending for goods increases faster than the supply of goods. The result is rising prices—and a declining value of money.

"Legislative bodies seldom directly authorize or impose inflation. But

they do adopt policies that lead to inflation.

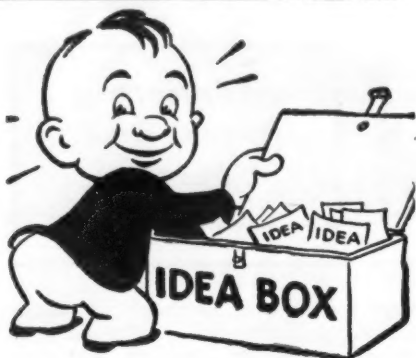
"Policies presently promoting inflation are those allowing wages to be raised faster than productivity, and those authorizing government expenditures in excess of receipts.

"Labor productivity increases about 3% a year. We permit much greater increases in wages. Consequently prices must be raised to make up the difference. That is simple arithmetic.

"When our government spends more than its income, the treasury must 'borrow' the difference. Some of the borrowing is from commercial banks and is simply an indirect way of creating new money. The spending of this money increases the demand for products.

"Inflation hurts almost everyone. It cuts the value of life insurance policies, savings deposits, bonds and social security and other retirement credits.

"An increasing number of economists, businessmen, public officials and other citizens are becoming concerned about the increase in this cruellest tax. It seems likely, however, that the public will support inflationary policies for several years at least. We will have to learn the hard way!"



What's New...

In Products, Services, Literature

You will find it simple to obtain additional information about the new products, new services and new literature described in this department. Here's all you have to do: (1) Clip out the entire coupon and return address card in the lower outside corner of this page. (2) Circle the number of the item on which you desire more information. Fill in your name, your company's name and your address. (3) Fold the clip-out over double, with the return address portion on the outside. (4) Fasten the two edges together with a staple, cellophane tape or glue, whichever is handiest. (5) Drop in any mail box. That's all you do. We'll pay the postage. You can, of course, use your own envelope or paste the coupon on the back of a government postcard if you prefer.

No. 7167—Agricultural Films

American Cyanamid Co. has published a booklet listing agricultural films available from its agricultural division. The illustrated booklet gives a brief description of each film, its title and length. For the most part the films deal with livestock production, and are available free for group showings. For further information, check coupon No. 7167 and mail to Croplife.

No. 6808—Chemical Folder

A four-page folder, containing specifications, descriptions, uses and shipping information about industrial chemicals, has been released by Sohio Chemical Co. The folder highlights the uses of anhydrous ammonia, aqua ammonia, nitric acid, urea and nitrate solutions in the manufacture of a large number of other products. Check No. 6808 on the coupon and mail to this publication for details.

No. 6809—Safety Wall Chart

A large safety wall chart providing instructions for the proper handling of chlorate and perchlorate chemicals

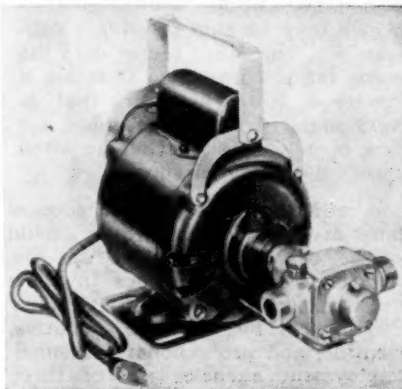
has been prepared by American Potash & Chemical Corp. for companies active in chlorate and perchlorate application. The wall chart contains a digest of safety rules and conduct. It includes such subjects as: materials that may ignite if mixed with chlorates or perchlorates, what types of clothing to wear and how to care for clothing when working with chemicals and other subjects. Check No. 6809 and mail for further details.

No. 6807—Research Handbook

After seven years of research, the Nitro-Form Agricultural Chemical Co. has published a handbook containing the results of experiments with Urea-form-based fertilizer. Called "Your 'Blue Chip' Fertilizer Program, Manufacturers' Handbook," the publication is aimed at all phases of the industry including production, research and sales. For more information, check No. 6807 on the coupon and mail.

No. 7160—Portable Pump

The Douglas Chemical Co. is merchandising a new portable pump. It is especially designed for the company's grain fumigants, but can be used for most any pumping job. Or-



dinary garden hose connections will fit the pump connections. Pump motors come in two sizes— $\frac{1}{4}$ h.p. and $\frac{1}{2}$ h.p. The motor is a single phase, 60-cycle, 115V, capacitor type electric motor with a 5-ft. cord and safety plug. Motor and pump are sold as a single unit.

No. 6806—Weed Killers

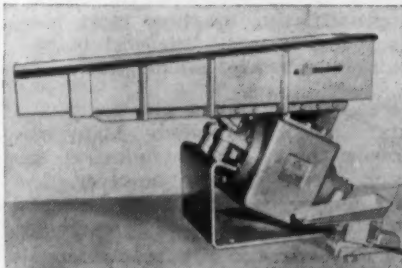
Four garden weed killers have been added to the Du Pont chemical line for next year. Included are Du Pont Chickweed Killer, based on neburon; Du Pont Crabgrass Killer, based on amine methyl arsonates (AMA); "Manzate" maneb fungicide; and Du Pont Combination Garden Spray, containing methoxychlor insecticide and "Parzate" zineb fungicide. All four products are formulated for use in hose sprayers or other common garden sprayers, the company said. For details, check No. 6806 on the coupon and mail to this publication.

Also Available

The following items have appeared in the What's New section of recent issues of Croplife. They are reprinted to help keep retail dealers on the regional circulation plan informed of new industry products, literature and services.

No. 7125—Vibratory Feeder

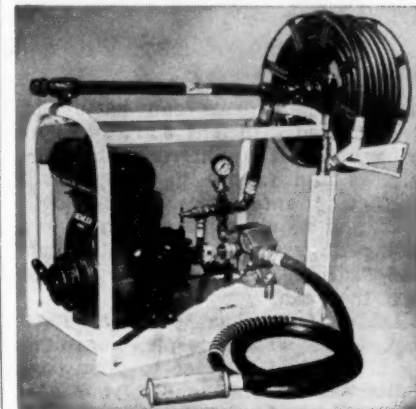
A new vibratory feeder with capacity rated at 10 tons per hour has been added to the Eriez Manufacturing Co. line of Hi-Vi feeders. The unit is designed to handle medium to heavy feeding to batch weighing scale, hoppers, processing mills, pulverizers, dryers, furnaces, belt conveyors, and the like. Seven standard trays are available in regular 16-ga. mild steel



or 16 ga. Type 304 stainless steel. The units incorporate the Eriez electro-permanent magnetic drive which requires no rectifier, and they can be wired into available AC power. Full details on the new unit can be had by checking No. 7125 on the coupon and mailing it to Croplife.

No. 7158—Grain Fumigant Pump

A pump-engine unit designed especially for the application of heavier-than-air grain fumigant materials



in flat or round storage buildings is being manufactured by the Tryco Manufacturing Co., Inc., and is being marketed by the Seedburo Equipment Co. The high-volume, vane type pump of the new model F-100 delivers capacities up to 19 gal. per minute, and is equipped with special packing that will withstand the penetrating action of grain fumigants. For more details check coupon No. 7158 and mail to this publication.

No. 7126—Valve Bag Packer

E. D. Coddington Mfg. Co. has released information on its Air-Pac packer which fills standard valve bags of from 20 lb. to 100-lb. capacity. A built-in scale provides close weight control and shuts off packer automatically when the desired weight is reached. A company statement said the machine uses the improved fluidizing air principle of conveying material into the bag. For more information, check No. 7126 on the coupon and mail it Croplife.

No. 6794—Vermiculite Folders

Applications and chemical and physical properties of vermiculite are presented in booklets issued recently by the Zonolite Co. The product's applications as a carrier for agricultural chemicals—insecticides, fungicides, weedicides—and as a conditioner for fertilizer are described. Contents of the booklets include also vermiculite's general characteristics, particle sizes, chemical composition, pH and buffering capacity and many other similar subjects. A complete listing of uses in modern industry is also included. Check No. 6794 on the coupon and mail it to Croplife to secure the booklets.

No. 7179—Copy Board Handbook

"How to Use Changeable Copy Boards Most Profitably" is the title of a 32-page pocket-size handbook published by Wagner Sign Service, Inc. Subjects in the handbook include advantages of using copy boards as a merchandising tool, storage of letters, planning and writing copy, applying copy to the board and changing copy. A list of 678 slogans is included in the book. Check No. 7179 on the coupon and mail it to secure details.

No. 6798—Fertilizer Bag Design

The Pelham Phosphate Co. recently adopted a new package design for its complete line of fertilizer products. Two packages, illustrating both the old and new designs, are shown

Send me information on the items marked:

- | | |
|--|--|
| <input type="checkbox"/> No. 6794—Vermiculite | <input type="checkbox"/> No. 7116—Hydraulic Unit |
| <input type="checkbox"/> No. 6795—Rubber-lined Tanks | <input type="checkbox"/> No. 7125—Vibratory Feeder |
| <input type="checkbox"/> No. 6796—Bag Design | <input type="checkbox"/> No. 7126—Valve Bag Packer |
| <input type="checkbox"/> No. 6799—Drum Filter | <input type="checkbox"/> No. 7127—Pneumatic Conveyor |
| <input type="checkbox"/> No. 6800—Food, Fiber Movie | <input type="checkbox"/> No. 7131—Flexible Loader |
| <input type="checkbox"/> No. 6801—Lime Spreader | <input type="checkbox"/> No. 7158—Fumigant Pump |
| <input type="checkbox"/> No. 6802—Seed Disinfectant | <input type="checkbox"/> No. 7160—Portable Pump |
| <input type="checkbox"/> No. 6804—Weed Killers | <input type="checkbox"/> No. 7167—Agricultural Films |
| <input type="checkbox"/> No. 6807—Handbook | <input type="checkbox"/> No. 7174—Industrial Fan |
| <input type="checkbox"/> No. 6808—Chemical Folder | <input type="checkbox"/> No. 7179—Copy Board |
| <input type="checkbox"/> No. 6809—Wall Chart | <input type="checkbox"/> No. 7181—Steel Buildings |

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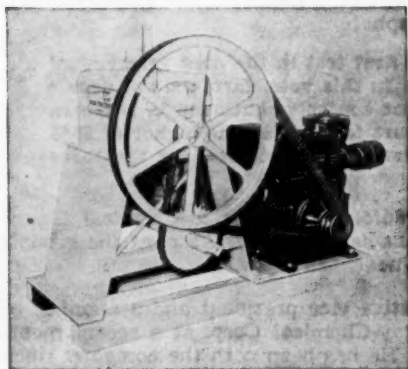
Minneapolis 40, Minn.



here. The new package design shown at the right was created by Union Bag-Camp Paper Corp. The more liberal use of color gives the new package better attention value and impact. In addition, the new design gives product and analysis information on both ends of the bag as well as in the gussets. Secure details by checking No. 6798 on the coupon.

No. 7116—"2-in-1" Hydraulic Unit

M&W Tractor Products has announced production of a portable combination speed jack and hydraulic control. The hydraulic unit with 15 ft. of high pressure hose will dump most wagon loads in less than a minute. Speed reduction for elevating and other uses is provided by a roller chain-sprocket unit delivering 3.5 to 1 reduction. Skid-mounted models are available for gasoline engine (5 to 7½ h.p.), electric motor (3 h.p.) or tractor PTO power application. The hydraulic pump will deliver 2,500 lb. pressure, adequate to raise 100 to



150-bu. grainloads. A positive, three-position valve controls raising, holding and lowering. Hydraulic fluid reservoir capacity is 15 qt. For more information and literature, check No. 7116 on the coupon and mail it to Croplife.

No. 7129—Pneumatic Conveyor Bulletin

A bulletin describing the Robinson Aire-Probe conveyor for handling fine, granular and dry pulverized materials pneumatically has been released by the Robinson Air-Activated Conveyor Systems division of Morse Boulger Destructor Co. The unit can be either portable or built in, and it can pick up its load from a pile on the floor or ground or can be hooked up permanently or temporarily to a loading chute. Bulletin No. 401, together with supplementary bulletins, will be supplied by checking No. 7129 on the coupon and mailing it to Croplife.

No. 7131—Flexible Loader

The Flex-Bend loader, manufactured by R. T. Sheehan Co. is described in a bulletin released by the company. Included in the loading unit are a power car, belt drive and stacker cars and as many center cars as required to make the desired length. Car dimensions are: power car, 36 in.; belt drive car, 36 in.; center car, 18 in., and stacker car, 96 in. It has four drive units, using three-phase, 220 or 440-volt power supply. Conveyor belts are 12 in. or 18 in. wide and they travel 36 in. above the floor at a speed of 120 ft. per minute. The 12-in. belt bends

horizontally on a 5-ft. inside radius and the 18-in. belt on a 6-ft. inside radius. The stacker boom will swing 180° and has an adjustable delivery height of from 18 in. to 72 in. and a belt speed of 400 ft. per minute to facilitate stacking. The bulletin can be secured by checking No. 7131 on the coupon and mailing it to Croplife.

No. 6799—Drum Filter Bulletin

Dorr-Oliver, Inc., announces the availability of a 24-page, two-color bulletin entitled "The Oliver Continuous Rotary Drum Filter for the Process Industries." The publication describes the various designs of the five principal types of rotary drum units and their component parts and details conventional accessories, auxiliaries, media and materials of construction. Also included are numerous photos and drawings plus tables of sizes and capacities of each design. Check No. 6799 on the coupon and mail to secure details.

No. 6801—Lime Spreader Brochure

Literature describing the "New Leader" Model L-145 lime spreader is now available from Highway Equipment Co. The brochure contains information about design, performance and specifications of the spreader. For additional details check No. 6801 on the coupon and drop in a mailbox.

No. 7174—Industrial Fan Bulletin

Bulletin No. I-585 issued by the Day Co. describes the line of Day industrial fans. Construction features, applications, fan arrangements and selection information are described in the 16-page booklet. Temperature and altitude selection data, capacity tables, dimensions, special arrangements and special types of fans are listed. The fans are manufactured in a variety of sizes with capacities ranging from 1,000 to 30,000 CFM and static pressures from 2 to 15 in. Check No. 7174 on the coupon and mail it to secure a free copy of the bulletin.

No. 7181—Steel Buildings in Color

Complete details about a pre-engineered steel building in color, using a new vinyl-aluminum protective coating, are contained in a brochure entitled "Stran-Steel Buildings in Factory-Applied Stran-Satin Color." Buildings are being offered in color coatings of blue, green, bronze, rose gray and white, as well as in the standard metal finish. The brochure may be secured by checking No. 7181 on the coupon and mailing it to this publication.

No. 6796—Rubber-Lined Tanks

Ranging in size from 55 gal. up to 12,000 gal., rubber-lined steel tanks are now available in 15 different stock sizes for quick delivery to fertilizer users. Abrasion & Corrosion Engineering Co.—fabricators of rubber-lined steel equipment for agriculture and industry—specializes in producing fertilizer tanks of all types, including applicator tanks, skid-type nurse tanks, and storage tanks. For tank types and sizes not included in their regular stock, A & C is geared to provide custom fabrication to required specifications, with delivery to any location. Check No. 6796 on the coupon and mail to secure details.

No. 6800—Movie on Food and Fiber

A film on agriculture entitled "Keep America Growing . . . Quality Food," a companion to the film "Keep America Growing . . . Quality Fruit," is being released by California Spray-

Chemical Corp. The 16mm color film, which was in production for three years, was shot by Everett L. Ingraham, agricultural movie photographer. It is a report on American agriculture and shows how growers and technical field men team up to meet the growing demand for top-quality, disease- and insect-free produce. Secure details by checking No. 6800 and mailing to Croplife.

No. 6802—Seed Disinfectant

A liquid suspension of thiram, for slurry treatment of seed and for use as a paint or spray repellent against rodents, rabbits, deer and birds, has been developed by the DuPont Co. Called "Arasan" 42-S seed disinfectant and protectant, the company states it is the first commercial liquid suspension of thiram and the development marks a major accomplishment in company history. For further details, check No. 6802 on the coupon and mail.

Stored Grain Insect Meeting Set for Oct. 21-24 in Kansas

MANHATTAN, KANSAS—Twenty-three speakers have been chosen to take part in the Conference of Stored Grain Insects and Their Control, Oct. 21-24 at Kansas State College here.

Conference officials said the meeting should be of interest to persons concerned with the formulation, sale, distribution and use of stored-grain-insect insecticides.

The program will be concerned with the basic facts and principles related to the insects themselves and special attention will be given to their structure, behavior and habits and to their damage to grain, the officials said. Also, part of the program will be given to control measures and the variable conditions that affect the success of control procedures.

Sponsors of the conference are Kansas State College, the Stored Grain Insect Laboratory, Manhattan; the Kansas Wheat Improvement Assn., Manhattan; and the Kansas Grain and Feed Dealers Assn., Hutchinson.

Further information can be obtained by writing or calling Donald A. Wilbur, Department of Entomology, Fairchild Hall, Room 302, Kansas State College.

Claim Massachusetts Apple Trade Future Is Bright

AMHERST, MASS.—Apple growing is looking up in Massachusetts, and it's a good place to grow and sell.

"The balance of advantages and disadvantages of the apple industry in Massachusetts is decidedly in its favor as a place to grow and sell apples," Fred Cole, extension marketing specialist, at the University of Massachusetts, says. "There has never been a time in this area that was any more favorable to the planting of apple trees than at present. A comparison of our soil, climate, market outlets, costs and competition points to the favorable business opportunities in fruit growing."

CALIFORNIA NURSERY

CONCORD, CAL.—A new nursery, operated by F. C. McAlvey, opened here recently. Located on Pleasant Hills Road, the new store handles a variety of fertilizers, seeds and chemicals for the lawn and garden along with a general line of nursery stock.

NEW WESTERN FIRM

IVANHOE, CAL.—Gayco Agricultural Chemical Services, Inc., opened here recently handling a variety of products for farm and garden. The new firm is located at Main and Depot Drive.

Gloomicides

My neighbor informed me proudly that her fifth grader had made the honor roll this month. Not to be outdone, and ignorant of the fact that the honor roll includes children only from the third grade through the eighth, I asked our six-year-old Marian if she, too, had made the honor roll this month.

"Why, mama," she replied solemnly, "we have no honor in the first grade."

★

Personnel manager to applicant: "What we're after is a man of vision; a man with drive, determination, fire; a man who never quits; a man who can inspire others; a man who can pull the company's bowling team out of last place!"

★

In a supermarket the other day, I heard a wife remark philosophically to her husband: "Look at it this way, dear—the more it costs the more stamps we get!"

★

A neighborhood lady had given herself a fancy new permanent. Two of her neighbors were discussing the job after she had gone home. "What do you think of it?" asked the first. "Well, to me," said the second, "it look like her pardon came through just as the warden pulled the switch."

★

"Bobby," said the teacher sternly, "do you know you have broken the 8th Commandment by stealing Jimmy's apple?"

"Well," explained Bobby, "I might just as well break the 8th and have the apple as to break the 10th and only covet it."

★

The girls who buy their forms divine Should dry them on an inside line.

★

"What I mean is," explained the insurance salesman to a bewildered rural prospect, "how would your wife carry on if you should die?"

"Well," answered the farmer reasonably, "I don't reckon that's any concern of mine—as long as she behaves herself while I'm alive."

★

On a guided tour of the Civil War battlefields, the guide gave instance after instance in which a handful of Grays routed regiments of Blues.

"Didn't the Yankees ever win?" probed a New Yorker.

Replied the guide: "Not so long as I've been directing this tour."

★

An Indian from Santa Fe was on his first visit to Los Angeles and was taken to see the fabulous Forest Lawn Cemetery.

He stood there gazing at the green lawns, shimmering ponds, gleaming statuary and he was obviously impressed. Turning to his companion, he grunted, "Ugh! These palefaces—they know how to live."

★

Maiden Aunt: "And what brought you to town, Henry?"

Henry: "Oh, well, I just came to see the sights, and I thought I'd call on you first."

★

"I eat grapes all day long," said the worried man to the psychiatrist. "So what?" demanded the psychiatrist. "Lots of people eat grapes."

Retorted the patient, "Off the wall-paper?"

PERSONNEL CONTROL

(Continued from page 9)

tion as applied to a specific skill. Basically, it involves establishing a correct work pattern—a set of work habits. It is not necessarily academic. Three kinds of training are worth considering separately: for new people, for regularly-employed and for promotable people.

The new employees should be oriented on your concern's objectives, organization, policies, regulations—and all other general "ground rules." After these basic points are covered, the actual operating details of the job must be explained and discussed until all questions of how, when and where are clearly understood.

Regularly-employed personnel require re-training from time to time. Typical objectives of such re-training would be to acquaint them with new products just introduced, or to show them how to sell familiar products by using a different approach. Then too, experienced employees occasionally need stimulating. This may take the form of a word of approval on a job well done, or a new goal to reach, or a careful, analytical appraisal of past performance. Whatever way it may be done, it is part of that employee's development.

Promotable people require a special sort of instruction. Typically, they will have been with your business for some time and will have shown ambition and energy as well as aptitude. They are ready to move up, but can progress only with additional knowledge. Training in this case may consist of periodic friendly conferences between you and them. Or it may be a special course taken off the business premises but paid for by your firm. Careful job assignments are particularly important in rounding out a man's experience and preparing him for heavier responsibilities.

2. How to Train. There are many ways to train employees within the company. Most of them have good points. But unquestionably, what works in one situation may not work in the next. Nevertheless, three techniques are of special value in small business: on-the-job personal coaching; lectures; and dramatization. No one of these methods is always superior to the others.

On-the-job personal coaching means developing an employee within his assignment, at his regular work place. It involves explaining, demonstrating, observing and correcting. The supervisor shows how and the employee practices. Mistakes are set right as you go along. Skill and confidence build up little by little each day. Better methods are evolved and tried out while the training progresses. As the employee's abilities grow, the intensity of the coaching can be reduced. This approach is effective at all levels of training, from clerks to managers. It can be applied to

manual operations or to the handling of policy questions. It has an advantage in that the training is conducted on a highly personal basis. But it can also be a time-waster unless you make it a rule always to have something to say, say it, and then quit.

Lectures are most valuable when you need to present a large amount of material in a short time. This method is very much like what you find in a classroom. One person organizes and presents material to others who listen and take notes. Naturally, only information that is easily digestible should be given by this method; for example, a review of changes in your merchandising policy.

Dramatization, or what is often called "role playing," can be effective in training large groups of employees. For instance, it is used widely with sales personnel. The plan is simple: A typical customer-salesman situation may be used to show the right and wrong ways of meeting objections, attempting to close sales or presenting new products. An instructor plays the role of a customer while an employee takes the part of a sales person—just as he will later have to do in real life. The other trainees watch as the "actors" show the best or poorest ways. Often these skits will be unrehearsed and the "buyer" will show a strong resistance to the "seller." After the skit is over, a critique may be held with "buyer," "seller," and audience participating.

With minor variations the skit method can, of course, be used to demonstrate ways of performing functions other than selling. The value of dramatizations can be summed up as follows: They develop skill and confidence through actual practice in situations where mistakes do relatively little damage, and where participation helps to stimulate interest in the training.

3. What the Trainer Should Know. Realize that you are training individuals, not groups of employees. Always expect your trainees to be intelligent adults and never "talk down" to them or treat them as though they were children. Remember that trainees cannot be expected to know everything; if they did they would not be trainees. Give them a chance.

Plan your program in terms of actual, current needs in your particular business. Tie it in with tangible benefits. For instance, show how doing a better job will mean more sales, more profits—and ultimately more pay. Money is something everyone understands. Make the most of it in the training program.

Encourage your employees to ask questions. This is the most natural way to find out what is bothering them. When you know that, you will

(Turn to PERSONNEL CONTROL, page 15)

SUMMARY

Smooth operating teamwork in a small business calls for more than a collection of individuals doing the best they can. Personnel control is needed—effective regulation of hiring, training and supervision. More is called for than matching the best available employees to the various tasks. Personnel control is vital in developing people for better performance and bigger jobs. It is essential in keeping everyone's efforts coordinated along the right lines. Fundamentally, personnel control should be provided through hiring, training, supervision, and leadership. Proper selection of persons hired will always pay off. This means tapping the best possible sources of employees and using sound interviewing and investigating practices. Training is the second main ingredient. Various methods can be used effectively, but whatever the approach, it must be planned and carried out with close attention to actual, current needs in the particular firm. If conditions change, training techniques should be shifted to meet them promptly. Supervision, the third element in personnel control, is the continuous process of checking up on how people are doing in comparison with established standards for their assigned jobs. Every employee requires some supervision. The accompanying article was prepared with the cooperation of the Small Business Administration.

What's Been Happening?

This column, a review of news reported in *Croplife* in recent weeks, is designed to keep retail dealers on the regional circulation plan up to date on industry happenings.

Farm income for the first eight months of the year showed a greatly improved rate, as compared with the first eight months of 1957.

An estimated 31% of approximately 37 million acres of oats harvested during 1954 received fertilizer, according to a report prepared by U.S. Department of Agriculture researchers.

A half-million dollar expansion of its Garfield, Utah, plant is being planned by Western Phosphates, Inc. The expansion would boost total volume of phosphate rock by about 10%.

A special working group representing industry and government is studying the needs of a comprehensive research program to find better means of controlling the boll weevil, most costly insect pest of the nation's cotton crop.

The recent grasshopper control program on ten Western States covered some five million acres, the U.S. Department of Agriculture reported. The effort was reported to have saved many thousands of acres of wheat and other small grain crops from insect damage.

Despite lower price supports for corn and cotton projected for 1959, the fertilizer industry expressed confidence that more acres of these crops will be planted next season.

Anhydrous ammonia sales increased 14% during the first seven months of 1958, the Agricultural Ammonia Institute reported.

Fertilization of wheat lands showed continual increase in past years, the USDA reported in the fifth of its series of articles on fertilizer use by crops and regions of the U.S. A continuing potential for sales was seen.

The American Chemical Society held its 134th meeting in Chicago with the presentation of numerous technical papers on fertilizer production.

Production of superphosphate in the U.S. for the period of July, 1957 to June, 1958, was 5% greater than that of the previous fiscal year, according to figures released by the U.S. Department of Commerce. The greatest gains were recorded in concentrated superphosphate.

The new farm bill will meet its first test in the corn referendum scheduled to be polled in December. In this vote, farmers will decide whether they want acreage allotment controls continued in the corn belt, and put the national price support for corn at the higher of 65% of parity or 90% of the national average market price for the three previous seasons.

Dr. R. T. Allman, president of Bradford Fertilizer & Chemical Co. of Canada, was elected president of the Canadian Fertilizer Assn. at the group's first annual meeting at Murray Bay, Que.

Howard J. Grady was elected executive vice president and a member of the board of directors of California Spray-Chemical Corp. at a recent meeting of the company's board of directors. He has been with the company since 1926.

Estimates for cotton and corn acreages for 1959 were made by the U.S. Department of Agriculture as follows: Cotton, more than 18 million acres, perhaps nearing 20 million acres. Corn will be planted in some 77.5 million acres, the estimate said.

Thomas R. Cox, American Cyanamid Co., was elected chairman of the Northeastern Research and Education Committee at its meeting on Aug. 22.

Production of ammonia in June, 1958, was below that of the same month of 1957, the Bureau of the Census reported. Comparative figures were 336,309 tons in June, 1958, and 348,158 tons the same month of the previous year.

USDA scientists discovered that the southern bean-mosaic virus or its infectious particles move from dead to living plant cells. This opens a new area for research in plant disease control.

A new chief forester for the National Plant Food Institute was named. He is Dr. Laurence C. Walker who took leave from the University of Georgia to take this special assignment.

The National Agricultural Chemicals Assn., through its executive secretary, Lea S. Hitchner, declared in a statement that the industry should not have to bear the cost of setting pesticide residue tolerances by the Food and Drug Administration, since the laws exist for the protection of the public and not for the benefit of pesticide manufacturers.

The Farm Bill, long-debated measure, was passed Aug. 18, awaiting the Presidential signature, considered certain. Despite wide predictions to the contrary, the bill did go through with only minor deviation from its version as passed by the Senate earlier.

The American Phytopathological Society met in Bloomington, Ind., to observe its 50th anniversary. Speakers told of possibilities for wider use of chemotherapeutics in the control of various plant diseases.

Spencer Chemical Co. announced a new line of non-pressure direct application solutions to its nitrogen products. Joe Tuning was named to coordinate the sales of anhydrous ammonia and solutions.

Fertilizer tonnages in California showed a considerable increase in the fiscal year 1957-58. Comparative total figures were 1,123,325 tons for 1957-58 as compared to 1,079,748 tons the previous fiscal year.

Yield estimates for the 1958 crop year were stepped up by the U.S. Department of Agriculture as of Aug. 1. Earlier estimates of crop production went by the board as a new look was taken. New records were set on some crops, and all were above average in volume.



Doing Business With

Oscar & Pat



By AL P. NELSON
Croplife Special Writer

The fall day was warm and golden, and although the leaves were yellow and red, there was every indication this was summer, not fall. Farmers were picking the last of their corn, getting hen houses ready for winter pullets and doing chores in general.

At the Schoenfeld & McGillicuddy Farm Store, the doors were wide open, although some bore new screens. The new screen doors leading to the office were Oscar's idea. Since he had gotten stung by a wasp which eluded his blows with a copy of Croplife, subsequently sending him to the hospital with shock, plus an injured spine, he had insisted on new screen doors to keep out the wasps.

This expense hurt him, but he fought with the hardware dealer for an hour over a 2% discount and won and this saved his frugality a little.

Tall, tanned Jim Pruden came into the farm store, chewing on his cud of tobacco.

"Hello, Oscar, old boy," he boomed. "Glad to see you back at the desk. I been kinda missin' them love notes yuh send out when my bill is five days overdue."

Oscar grunted and kept on with his figuring. Since he had lost so much time in the hospital with his ailments and injury, he now worked more slavishly than ever, trying to make up for lost time. As a result he was a little more curt with customers, especially those who liked to kid and visit.

"I meant to come over to the hospital and visit with yuh," Pruden apologized, "but my hired man quit on me about that time. So the old lady and I had to do all the work. Nights I was so tired I just hit the hay right after supper."

"Ach, that hospital they charged too much," muttered Oscar. "Always they wanted to give me shot after shot. I got so tired staying awake so they wouldn't give me too many \$5 and \$10 shots that I am not rested yet."

"Yep," said the farmer. "I know how it is. A feller kin get poor in a hospital in a short time. The only way is to stay out of the hospital in the first place."

Oscar snorted. "Ach, how couldt I do that? That wasp. Somebody had to kill him."

"The way I heard it, you didn't kill him at all," said Pruden gently. "You missed him and he swung around and took a shot at your neck."

Oscar paled as he relived the pain and the shock of the moment. "Ach, it's over now. I forget it."

"Well, there are lots of other wasps in the world," said Pruden. "Pat killed the one that stung you by usin' a pressure spray. But you have to protect yourself against wasps in the future, Oscar."

"I haf," countered Oscar irritably. "I hadt new screen doors put on for the salesroom. Ach and such prices they charged."

"But the warehouse is open most of the time," Pruden said. "You can't keep the wasps out of there, can you?"

Oscar had to admit this was true, and he paled a little.

"My wife and I have a remedy for you, Oscar," continued Pruden. "It's been a family secret for a long time. Here it is. Wasp stings won't bother you any if you use this."

He handed Oscar a small bottle in which were four onion halves. Oscar looked at it speculatively.

"Ach, onions!" he exclaimed. "What good are they for wasps?"

"Plenty," said Pruden, with a smile. "After the wasp stings you then you press one of these onion halves on the sting. It takes the poison out and you don't swell up."

"After I get stung!" echoed Oscar. "Ach, I don't want to get stung any more."

"Who does? But if you do, it's worth it to have onions handy to stop swelling and further poisoning, Oscar. After all, onions are cheap."

"Yah, sure, I know that," Oscar returned sharply. "It ain't the cost of the onions that bothers me. It's just the wasps."

"Now, let me tell yuh somethin'," Pruden went on. "My old lady got stung in the raspberry bushes last year, the day before she was to go to a family reunion in Minnesota. She slaps an onion on the sting and kept it down. She also carried onions with her in a jar in her suitcase. On the

train she'd go into the ladies room and put the onion on the sting for five or ten minutes. And believe it or not, Oscar, by the time she got to Minnesota you could hardly tell where she was stung."

"Where was she stung?"

Pruden looked pained. "Oscar, let's skip that. But these onions are good for stings. And I have another idea. Maybe you can pass it on to your salesmen for those chemical companies—maybe they'll pay you for the idea."

"Ach, now you talk like that crazy Irishman," snapped Oscar. "He's always got too many ideas. And they cost too much."

"I got to thinkin'," said Pruden. "This is the age of gadgets to make life more comfortable and safe. Now I understand Pat used that pressure can to kill the wasp you didn't swat."

"Yah, he didt and we didn't sell

that can yet. Everybody that comes in asks, 'Is this the can that you used to kill Oscar's wasp?' They won't buy it, because it ain't full like the others."

"Offer it at a discount," Pruden suggested. "Sell it for 10 or 20¢ cheaper."

"But then we won't make any profit," Oscar growled. "Ach, we can't lif that way."

"Well, this idea I had," Pruden said, "is to invent a long tube of about eight feet. It would be a wasp poison applicator. You'd slip a can of spray into one end and then stick the tube close to the wasp nest, pull a trigger and let them have it. Then you'd be far enough away you wouldn't get stung. With those pressure guns you have to stand too close to the wasps."

Oscar stared. "Ach, such an applicator would cost too much."

"Women and their city husbands would love it," Pruden said. "You could stand on the ground and kill wasps in nests under the eaves, without much danger of getting stung. Well, I see you ain't interested, Oscar. You'll be sorry. Here's Pat. I'm sure he'll like the idea. Maybe we can form our own manufacturing company and sell them."

Books on Fertilizers And Their Use

FOREST FERTILIZATION

Donald P. White and Albert L. Leaf

A bibliography, with abstracts, on the use of fertilizers and soil amendments in forestry. Useful to those interested in prospects of a plant food market in forest areas, the book resulted from a special two-year study at the college of forestry, Syracuse University, Syracuse, N.Y., under sponsorship of the Nitrogen Division of Allied Chemical & Dye Corp. The book contains 300 pages, 700 references, with abstracts, and covers the period from 1865 through 1956. In—\$3.00

SOIL FERTILITY AND FERTILIZERS (1956)

Samuel L. Tisdale and Werner L. Nelson

An advanced college text, for juniors and seniors, following backgrounding course in soils. Covers elements required in plant nutrition, their role in plant growth, and the soil reactions to these nutrients. Several chapters on manufacture, properties and agronomic value of fertilizers and fertilizer materials. Latter part covers soil fertility evaluation and use of fertilizers in sound management program. 430 pages, cloth bound\$7.75

PLANT REGULATORS IN AGRICULTURE

Dr. Harold B. Tukey

Published September, 1954. A text book giving background material for county agents, farmers, citrus growers, nurserymen, gardeners; providing fundamentals and general principles; covers encouragement of roots by plant regulators, control of flowering and fruit setting, parthenocarp, abscission, prevention of preharvest fruit drop, delaying foliation and blossoming, maturing and ripening, inhibition of sprouting and weed control. Brings together specialized knowledge of 17 authorities in the field, with two chapters written by Dr. Tukey, head of department of horticulture at Michigan State College. 269 pages\$6.50

THE CARE AND FEEDING OF GARDEN PLANTS

Published jointly by the American Society for Horticultural Science and the National Plant Food Institute.

An entirely new, one-of-a-kind book. It is designed to acquaint readers with nutritional deficiency symptoms or "hunger signs" of common yard and garden plants including lawn grasses, shrubs, flowers, garden vegetables and cane and tree fruits. It stresses plant "feeding," or "what makes plants grow." Sixteen of the nation's leading horticultural authorities collaborated in its preparation. Cloth bound, 300 pages of text and illustrations including 37 pages in full color\$3.00

AUXINS AND PLANT GROWTH

A. Carl Leopold

A 366-page book, complete with bibliography, appendix, and index, discusses the fundamental and applied aspects of growth hormone and synthetic auxin action in plants. These are of interest to all workers in agricultural chemicals—for weed control, flowering control, fruit set, flower or fruit drop and plant propagation. The text is divided into two sections, (1) fundamentals of auxin action, and (2) auxins in agriculture. These cover developmental effects of auxins, the physiological and anatomical effects of their application, the chemical nature of growth regulators, and methods of applying auxins and their persistence in plants and soils. Other subjects covered: rooting, parthenocarp, flower and fruit thinning, control of pre-harvest fruit drop, flowering, dormancy and storage, herbicides, miscellaneous uses of auxins, and potentials of auxins and auxin research. Published by University of California Press.....\$5.00

ECONOMIC AND TECHNICAL ANALYSIS OF FERTILIZER INNOVATIONS AND RESOURCE USE

By E. L. Baum, Earl Heady, John Pesek and Clifford Hildreth.

This book is the outgrowth of seminar sessions sponsored by TVA in 1956. Part I—Physical and Economic Aspects of Water Solubility in Fertilizers. Part II—Examination of Liquid Fertilizers and Related Marketing Problem. Part III—Methodological Procedures in the Study of Agronomic and Economic Efficiency in Rate of Application, Nutrient Ratios and Farm Use of Fertilizers. Part IV—Farm Planning Procedures for Optimum Resource Use. Part V—Agricultural Policy Implications of Technological Change. It presents new methodological techniques for more efficient handling of research problems related to fertilizers and provides more meaningful answers to problems of practical application\$4.50

HUNGER SIGNS IN CROPS—Second Edition

A symposium—published jointly by the American Society of Agronomy and the National Plant Food Institute.

A comprehensive study of nutrient-deficiency symptoms in crops compiled by 19 of the leading authorities in the field. It is being widely used by college professors, research and extension specialists, industrial chemists and agronomists, county agents and teachers of vocational agriculture. Many farmers have found it of particular value in planning their fertilizer programs. Cloth bound, 390 pages, 242 illustrations, including 124 in full color\$4.50

USING COMMERCIAL FERTILIZER (1952)

Malcolm H. McVickar

Dr. McVickar is chief agronomist of the National Fertilizer Assn. The book deals specifically with commercial fertilizer, how it is produced and how to use it. It is non-technical. It includes chapters on how to measure fertility of soils, secondary and trade-element plant foods. 208 pages, 106 illustrations, cloth bound.....\$3.50

COMMERCIAL FERTILIZERS, Their Sources and Use—Fifth Edition (1955)

Gilbeart H. Collings

Based upon the author's practical experience as an experiment station agronomist and teacher, and incorporating information on recent developments by agronomists, chemists, engineers and fertilizer manufacturers. Authoritative on problems concerning commercial fertilizers and their use in gaining larger yields. 160 illustrations, 522 pages\$8.50

APPROVED PRACTICES IN PASTURE MANAGEMENT (1956)

M. H. McVickar, Ph.D.

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Credit and Collection Controls for Small Marketers

By Clyde William Phelps

Professor of Economics, University of Southern California

Statistical records, or control devices, for credit and collections are easily derived from conventional books of account. They are valuable in a half dozen important ways:

First, the periodic calculation of ratios, percentages and other figures is necessary to measure credit and collection results. Unless this is done, you have no way of knowing just what has been accomplished and what changes have occurred in each of the various aspects of your firm's credit business.

Second, keeping these statistical records makes it possible to set up standards or goals to shoot at in each phase of your credit and collection activity. Without standards, you have no basis for judging accomplishments. Also, an important stimulus to efficiency will be lacking.

Third, the accumulation of records kept on the same basis from year to year enables you to compare current credit and collection performance with that of previous periods, and to determine the progress made. Credit-sales volume for the current month, for instance, may be compared with the figure for the same month last year, or the preceding month this year, to see whether there has been an increase or decrease.

Fourth, if your firm's credit business is large enough to require the time of more than one person, comparisons often may be made between different individuals. You can calculate separate collection percentages for each person having responsibility for a given section of the accounts. Separate rejection percentages may be computed wherever two or more persons are engaged in granting credit.

Fifth, you may compare results shown by your figures with those reported by other firms. Data for such comparisons are published by the National Retail Credit Association, the Credit Management Division of the National Retail Merchants Association, and many national trade associations in many specific lines of business, as well as by the Board of Governors of the Federal Reserve System.

Sixth, the records you maintain may be used in forecasting future trends in credit sales volume, collections and other aspects of your credit business. These forecasts can be very helpful in revisions of your general budget, and they often suggest changes in your credit and collection policies.

A Common-Sense Approach

A business firm may use a great variety of measures for controlling credit and collection efficiency. However, as a matter of common sense, only a dozen of these are generally regarded by successful small business managers as being of major importance. It is convenient to group these statistical controls under the functions of credit management to which they are most closely related; that is, credits or collections. It should be understood, of course, that a given ratio or percentage often reflects something other than just the degree of efficiency in either credit granting or collection.

For example, an unduly low collection percentage may actually reflect inefficiency in credit granting (too many accounts being opened for buyers who, with proper investigation, would have been found unable and/or unwilling to pay as agreed). Or it may result from lack of proper and prompt follow-through in connection with accounts receivable. Then again,

it may reflect the effects of depressed business conditions on a firm in which both credit granting and collections are being conducted at top efficiency. Collection percentages and the other indexes to be examined, however, do show actual results and afford measures by which performance may be judged and control exercised.

Credit Control Indexes

Perhaps the best known indexes used in measuring the effectiveness of credit granting are the rejection percentage and the percentage of change in credit-sales volume. Along with the rejection percentage, you may keep figures on the number of accounts added, the number closed, and the net gain or loss in number of accounts. In addition to the change in credit-sales volume, you can follow such closely related indexes as the ratio of credit sales to total sales volume, the change in the amount of accounts receivable outstanding, the ratio of inactive accounts to total accounts and the turnover of customers.

1. Rejection Percentage. The rejection percentage is computed by dividing the number of applications for credit declined (for lack of proper requirements or for other reasons) by the total number of applications received. Thus, if 150 applications or first orders are received during a given period and 15 are declined, the rejection percentage would be .10 or 10%.

If you discover that your rejection percentage is becoming extremely high, you may rightly inquire whether your credit-granting policy is so strict that it is preventing you from enjoying a much greater sales volume. If the percentage seems to be getting excessively low, you should check to see whether this is causing abnormal collection expenses and bad-debt losses.

2. Trend in Number of Accounts. You should be interested also in the actual number of applications accepted and the net increase or decrease in the number of accounts on your books. In progressive firms, figures are calculated monthly (and often daily) for the number of new accounts added, the number of accounts closed and the net gain or loss in number of accounts.

These three figures may be expressed also as percentages of the number of accounts on your books at the beginning of a period. The figures or percentages may be compared with those for the previous period and also with those for the same period in the previous year.

3. Change in Credit Sales Volume. Of perhaps even greater interest are measures of increase or decrease in credit sales volume. To show the percentage of change in your credit sales from one period to another, divide the difference between the figures for the two periods by the amount of credit sales for the less recent period. Mark the result with a minus sign in front if the difference represents a decrease in sales.

For example, if your credit sales were \$10,000 for last month and \$12,500 for the preceding month, divide the difference (\$2,500) by the sales for the less recent period (\$10,000), giving a percentage of .25 or 25%. The minus sign shows that the difference represents a decrease in credit sales.

4. Ratio of Credit Sales Volume to

Total Sales. To find this ratio, divide the figure representing the sales made on credit by total sales for the month, or other period. Thus, if your total sales for the past month were \$6,200 and \$3,410 of this volume was made on credit terms, divide the credit sales of \$3,410 by the total sales figure of \$6,200, yielding .55 or 55%.

Your ratio of credit sales to total sales may change with seasonal conditions during the year, or in response to the introduction of new credit plans, different policies or because of other factors. In short, do not arbitrarily assume that a decline in the ratio is always due to inefficiency in credit granting. By the same token, a rise in the ratio may not always result from credit-sales-promotion efforts alone.

5. Change in Accounts Receivable Outstanding. Important, and closely connected with indexes of changes in your firm's credit sales volume, are measures of your accounts receivable outstanding. In progressive firms, the amount of accounts receivable outstanding (the total amount of money owed to the firm by its customers) is calculated daily. The increase or decrease from the preceding period, or from the same period of the preceding year, is then expressed in percentages.

The dollar figures obtained in these calculations disclose a very important fact; namely, the extent to which your money is tied up in financing customers. Comparative percentage figures reveal the trend.

To find the percentage change in your receivables from one period to another, divide the difference between the amounts outstanding in the two periods by the amount outstanding in the less recent period. For example, if your accounts receivable outstanding amounted to \$10,000 at the end of last month and are \$12,000 at the end of this month, divide the difference of \$2,000 by the outstandings for the less recent period (\$10,000), giving a percentage figure of .20 or 20%.

6. Ratio of Inactive Accounts to Total Accounts. You will find that monthly figures on the number of accounts becoming inactive are important in controlling the correct and full use of accounts. These figures help in maintaining and increasing credit-sales volume.

You find the percentage of inactivity—that is, the proportion of customers not buying on their accounts during the month—by dividing the number of accounts not making any purchases during the month by the total number of accounts on the books at the beginning of the month.

7. Ratio of Turnover of Customers. This ratio expresses the proportion of customers you lost during a given period, usually a year. To obtain this figure, divide the number of accounts removed from your books during the year by the total number of accounts on your books at the beginning of the year.

Changes in this turnover ratio indicate the degree to which you are succeeding or failing in your efforts to keep customers after you have once placed them on your books.

Collection Control Indexes

The statistical records of most importance in administering the collection function are collection percentages, changes in volume of collections, delinquency percentages, age analysis and bad-debt loss percentages.

8. Collection Percentage. The usual method of calculating collection percentages on open accounts is to divide the amount collected from accounts receivable during a month by the amount of accounts receivable outstanding on the first of that month.

In the case of installment accounts, there is only one method of calculating collection percentages so as to indicate your collection efficiency correctly. Divide the collections made during a month from your installment accounts by the portion of those accounts which is due and outstanding on the first of the month (including past-due amounts).

You can also convert collection percentages to express the turnover of accounts receivable; that is, the average number of days taken by customers to pay their bills in full. Collection percentages are calculated for one month, or 30 days. Therefore, 30 divided by the collection percentage and multiplied by 100 will give the average number of days taken by accounts to pay out in full.

For example, if your collection percentage is 50, dividing 30 by 50 gives .6. Multiplying .6 by 100 yields 60 days as the average length of time your customers take to pay up their accounts.

9. Changes in Volume of Collections. Not to be confused with the collection percentage discussed above is the percentage of change in the dollar volume of collections. You obtain the latter by dividing the difference between the amounts collected in two different months (or other periods) by the amount you collected during the less recent period.

This percentage is useful when you compare it with percentages showing the increase or decrease in credit sales. It indicates how your dollar volume of collections is moving in relation to changes in your credit-sales volume.

10. Delinquency Percentage. You will find it extremely helpful to know what proportion of your receivables is past due—or delinquent—and whether the delinquent portion is increasing or decreasing.

The number of accounts which are delinquent as well as the dollar volume of delinquent balances, is recorded monthly or less often. You figure the delinquency percentage for number of accounts by dividing the number of accounts having delinquent balances by the total number of accounts. The delinquency percentage for dollar volume is derived by dividing the amount of the delinquent balances by the total amount of receivables outstanding.

11. Age of Receivables. For good control you ought to know what proportion of your total receivables is one month past due, two months behind and so on. Then, for example, if a delinquency of 3 months or more appears, you know that extra collection efforts should be given to that

SUMMARY

To assure efficient operation of a small firm, it is necessary to measure and control a number of factors in its credit and collection operations. The small retailer, wholesaler, or service tradesman cannot make use of high-priced specialist or expensive equipment and systems. Attention, therefore, is given in this Aid to simple controls which the small business owner can apply in recording and measuring the results of his credit and collection activities. When several kinds of credit business are done (for example, a small retail store offering charge, budget, and installment plans), the various indexes for credit and collection control should be calculated separately for each class of credit business. As to expense considerations, it will usually be found that the cost of developing these credit and collection figures is generally negligible or minor. Most of the data may be derived, with only a little additional time and effort, from everyday bookkeeping operations. The accompanying report was prepared by the author for the Small Business Administration.

account. You get this valuable information from an age analysis. It is done in three steps.

First, decide how far back you wish to carry the aging. You might, for example, determine to make your age analysis of outstanding balances cover four ranges: 1 month, 2 months, 3 months and over 3 months.

Second, establish your starting point on the account to be aged. To do this, add the cash payments made by the customer back to a point where the account will balance. If it does not balance (as is the case where the customer just pays "on account"), add the cash payments made during the three months. Then subtract this total from the balance owed by the customer at the end of the fourth month.

Third, calculate the net balances for each of the other months. Do this by deducting the credits (for returns and allowances) from the purchases made in each of the months.

The correctness of the figures computed may be easily checked. The total of the amounts shown for the various ages (1 month, 2 months, 3 months and more) should equal the total balance now owed by the customer.

12. **Bad-debt Loss Percentage.** The total amount of accounts receivable which you write off as uncollectible constitutes your gross bad-debt loss for the period covered, usually a year. This amount divided by net credit sales for the period will give your gross bad-debt loss percentage.

However, as time goes on, some money will actually be collected during a given period from accounts you charged off as bad debts in previous periods. The amount of such recoveries is subtracted from the gross bad-debt loss mentioned above. The remainder, then, will be your net bad-debt loss for the period in question, for example, the year just ended. You can divide the amount of this net bad-debt loss by your dollar volume of net credit sales for the period, to find your net bad-debt-loss percentage.

In addition to bad-debt-loss records, you can keep figures on repossession if your firm sells on the installment plan. Divide the figure representing the total balances owed on contracts subjected to repossession during the period, by the total dollar volume of installment sales for that period. The result is your repossession percentage in terms of dollar volume. In addition, you can divide number of sales on which repossessions occurred by total number of sales made on the installment plan during the period to get your repossession percentage in terms of number of sales.

For Further Information

Businessmen interested in exploring further the subject of credit and collection control may wish to consult the publications mentioned below. Other titles of course could have been cited; however, in keeping with the policy of the series, this list is necessarily brief and selective. No slight is intended toward authors whose works are not mentioned.

A detailed treatment of indexes for credit and collection control is to be found in Chapters 8, 9, and 10 of "Retail Credit Management," by C. W. Phelps. National Retail Credit Association, 375 Jackson Ave., St. Louis 5, Mo. 1949. \$6.

"Credits and Collections in Theory and Practice," by T. N. Beckman and R. Bartels. McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N.Y. 1955. \$6.50.

"Credit and Collection Management," by W. J. Shultz and H. Reinhardt. Prentice-Hall, Inc., Englewood Cliffs, N.J. 1954. \$9.

"Retail Credit Manual," by J. Gordon Dakins. National Retail Dry Goods Association, 100 W. 31st St., New York 1, N.Y. 1950. \$10.

New England News Notes

By GUY LIVINGSTON
CROPLIFE Special Correspondent

Generally favorable reports on vegetable crops for New England have been forecast by the U.S. Department of Agriculture. The department reported that yield prospects of snap beans were materially improved by favorable weather in August and substantial supplies will be available though the peak harvest has been passed.

Cabbage production for fresh market and sauerkraut also has passed its peak, according to the report, but supplies will be adequate and a good fall crop is in. In Massachusetts, an excellent late summer crop of carrots is being gathered.

Massachusetts expects to produce more cranberries than last year. The agriculture department has forecast production of the 1958 crops of cranberries at 1,076,500 barrels. A crop of that size would be 2% above last year's production and 13% above average. It would be the largest since 1953. The report said Massachusetts, New Jersey and Wisconsin expect to produce more cranberries than last year, but that Washington and Oregon will have fewer.

The National Cranberry Assn., convening in Hanson, Mass., elected George C. P. Olsson, Plymouth, superior court clerk, as its president for the coming year. He succeeds Frank P. Crandon of Acushnet.

Ambrose E. Stevens, general manager, told the group business conditions in the industry had improved. At the same time, he urged an all-out promotional campaign to compete with other fruit industries.

Reelected were Charles L. Lewis, Shell Lake, Wis., vice president; Russell Makepeace, Wareham, Mass., secretary.

Apple Industry Changes

Some of the changes that are expected in the apple industry in New England in the next few years have been listed by leaders in the apple growing industry. They are: Introduction of varieties more resistant to disease and insect attack and firm enough to permit the use of grading and packing equipment and with long stems so picking can be done with harvesting equipment.

Electric eyes, automatic equipment that will grade fruit for color and blemishes, are another change expected. Artificial pollination making it possible to regulate size of crop is another.

Other changes forecasted include: chemicals that will promote the red color of apples when applied as sprays without causing premature ripening; controlled atmosphere storages in which the concentrations of the gases will be controlled automatically; new apple products and their byproducts; atomic energy to reduce damage from frosts; systemic materials that can be applied to the soil or injected into the tree for pest control; light or sound waves to control insects; and increased use of air craft for applying pesticides.

The expected changes are a far cry from 30 years ago. At that time, packing apples was done mostly in the orchard. Some growers sold their fruit directly to buyers, others sold to commission merchants and some fruit was stored in large commercial storages. A common practice was for buyers to visit growers prior to harvest and offer a price for the crop, harvested and graded according to the buyer's specifications, the buyer supplying the barrels or containers.

Thirty years ago the barrel was still in use as a container for apples.

This year, the apple industry is warning against careless picking. "Is the apple industry of Massachusetts going to try to sell 989,000 bu. of bruised apples this year due to careless picking?" they ask in mailing pieces to growers. The literature also states: "Records show that careless picking results in 43 one-half inch bruises per 100 McIntosh apples. Bruise-free apples frequently sell for 50¢ bu. more. One bushel in five is therefore lost at \$2.50 bu. in careless picking. It would be better to pick 4 bu. carefully than to pick 5 bu. carelessly. Better 80% of crop picked carefully than 100% picked carelessly. Good picker supervision and/or pay incentives mean the difference."

Flea Infestation

A flea infestation in Massachusetts is reported by entomologists at the University of Massachusetts, and many physicians in Boston reported that they had treated patients for severe bites, believed caused by fleas.

In regard to the flea attack, Ellsworth H. Wheeler, extension entomologist at the University, said: "I have recently been receiving many reports of serious flea infestations all across the state, and most of the re-

ports claim that the infestations are caused by 'sand' fleas. However, there is no such insect as a 'sand' flea.

"The insects causing great discomfort to residents of the state are the common cat-flea and dog-flea," he said. "Although these two fleas are distinct, they both feed on either animal and when no animal is available to them, they will attack man. Some people are more susceptible to them, just as some dogs and cats are affected more than others.

"Every year at this time fleas become numerous—not only in houses but in yards. Adult fleas are parasitic, that is, they must have a blood meal before they can reproduce," explained Mr. Wheeler. "However, fleas can live several weeks without food while growing into adulthood. This fact explains why people who own dogs or cats sometimes find their homes overrun with fleas when they return from a vacation, even though no adult fleas were there when they left."

For adequate protection against these pests, the entomologist suggested a 1% lindane powder, a 5% chlordane powder, or a 10% methoxychlor powder.

(Continued on page 17)

PERSONNEL CONTROL

(Continued from page 12)

know what points need further attention. When conditions change, shift your training promptly to meet the new needs.

Supervision

Supervision is the third major element in personnel control. Because it is a somewhat intangible aspect of operating a business, many managers do not give adequate thought to how supervision really ought to be done. Actually, it should be a continuous process, but not an annoying one. As the function performed by the boss when he checks up to see how employees are doing, it is the most direct form of control. Good supervision will include careful explanation to each new employee of his responsibilities, the authority he has and the sources from which he can get help. In addition, periodic reviews will be made to see how well a new employee is handling his assignment, and constructive suggestions will be made.

Supervision is partly a measuring of performance against established standards, and is partly a continuation of an employee's education. But it should not be considered a substitute for primary training. Supervision begins where primary training stops and continues for the duration of an employee's stay with the company.

1. **Why Supervision?** Good supervision reduces the cost of operating by lessening mistakes and employee turnover. It helps employees to gain more satisfaction from their jobs. By correcting errors early, effective supervision means more earnings all around. Ultimately, it reduces the amount of re-training necessary and improves customer-employee relations.

Supervisory control is often more important in a small business than in a larger one. Why? Because the normal small enterprise depends more on the performance of each individual than does the big company. For instance, a small store has four employees. Each one is responsible, on an average, for one-fourth of the store's customers. If just one employee does a poor job, he can conceivably drive away up to a quarter of the store's business.

2. **Who Is to Be Supervised?** Every employee in your organization requires some sort of supervision. Many will need it constantly if the busi-

ness is to operate efficiently. However, the lower-paid and less-educated employees will not always require the most supervision. The need for supervisory control over people is more a question of who has a sense of responsibility and initiative and who does not.

To be sure, some employees may need close supervision because they lack experience or aptitudes which allow them to grasp the details of their jobs quickly. Other employees may require considerable personal attention because they are being trained for new and bigger jobs in the organization.

For good personnel control it is helpful to recognize that whenever employees are hired or promoted, they should start their new jobs supervised in the right way. This is essential both to the individual and to the concern. Any worthwhile employee needs to start off on the right foot—not only for his own peace of mind but also in order to do the best possible job for the firm.

For Further Information

Businessmen interested in exploring further the subject of personnel control are referred to the publications mentioned below. Other titles, of course, could have been cited; however, in keeping with the editorial policy of the series this list had to be kept brief and selective. No slight is intended towards authors whose works are not included.

"Personnel Relations," by A. M. Whitehill. McGraw-Hill Book Company, 330 West 42nd St., New York 36, N.Y. 1955. \$6.

"Personnel Management (3rd Ed.)," by M. J. Lucius. Richard D. Irwing, Inc., 1818 Ridge Road, Homewood, Ill. 1955. \$8.35.

"Personnel Interviewing," by J. D. Weinland and M. V. Gross. The Ronald Press Co., 15 East 26th St., New York 10, N.Y. 1952. \$6.

"Selecting and Inducting Employees," by G. D. Halsey. Harper and Brothers, 49 East 33rd St., New York 16, N.Y. 1952. \$4.50.

"Retail Personnel Management," by W. R. Spiegel and J. W. Towle. McGraw-Hill Book Company, 330 West 42nd St., New York 36, N.Y. 1951. \$5.50.

"The Supervision of Personnel," by J. M. Pfiffner. Prentice-Hall, Inc., Englewood Cliffs, N.J. 1951. \$5.

WEED OF THE WEEK

Mr. Dealer—Cut out this page for your bulletin board



Mallow

(*Malva rotundifolia* L.)

How to Identify

This weed is also known as common mallow, dwarf mallow, running mallow, and "cheeses." It has leaves nearly round with the edges slightly lobed and crisped. The seeds are arranged in a circle within a cup made by the calyx bracts. They are dark grey, flattened, and nearly circular with a notch at one side. The plant has a prostrate habit of growth, with stems extending from the crown from one to three feet.

Where Mallow Is Found

The weed is found largely in cultivated ground, farmyards, waste places, and in lawns. One reason for the ubiquity of the plant is the fact that clover and lawn seeds often contain mallow seeds as well. Distribution of the plant is general throughout the north central states.

Habits of Mallow

The plant is an annual or biennial with short straight taproot, reproducing only from seeds. Seeds are reddish-brown, about 1½ mm. long, notched. The plant flowers May to October, and seeds June to November. Mallow is not a native of North America, having been introduced from Eurasia.

Control of Mallow

Chemical herbicides are effective in controlling this plant but, according to some authorities, several applications of 2,4-D are required to eliminate it completely from a given area. Cultural methods include plowing up infested land where possible, and planting to a cultivated crop. Hoeing or pulling up the plant before the development of seed is effective where only a small area is affected.

Photograph of Mallow furnished through courtesy of The Dow Chemical Co., Midland, Michigan.

Insect

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NEW ENGLAND

(Continued from page 15)

Insect Control Book

"The Principles of Biological Control," a treatment of the subject on a world-wide basis, is the title of a new book just written by Dr. Harvey L. Sweetman, professor of entomology at the University of Massachusetts.

Written for both students and research workers, the new book is a revision and extension of an earlier book "Biological Control of Insects," which brought Dr. Sweetman international recognition in 1932. It is the only book available that covers the broad field of biological control of animals.

The author of numerous papers appearing in scientific journals here and abroad, Dr. Sweetman has written agricultural experiment station bulletins on various topics of entomology since 1925. He attended the last two International Congresses of Entomology in Amsterdam and Montreal and took part in discussions and gave papers on biological control of insects.

Peach Crop

Massachusetts growers are harvesting a bumper peach crop, estimated at a whopping 120,000 bu. The bumper crop, a far cry from the nearly non-existent crop of 8,000 bu. reported last year, exceeds the 1947-56 average of 79,000 bu. by a considerable margin.

"This crop has been favored by ample rainfall during the summer," Dr. W. J. Lord, extension pomologist at the University of Massachusetts, reported.

"I don't know where the reported 8,000 bu. of peaches came from last year; the only locality in Massachusetts having peaches in 1957 was Cape Cod which has very few peach orchards," he added. The reason for the light crop in 1957 was the sub-zero temperatures during January of 1957, killing the majority of peach flower buds.

The harvest season for Massachusetts peaches lasts through September and many new varieties have been introduced in the state to extend the market harvest season.

Contest Winners

Massachusetts' three state winners in the 1958 New England Green Pastures-in-Winter Program joined their counterparts in the five other states as guests of honor in Springfield, Mass., at a recognition dinner at the Sheraton Kimball Hotel. The 18 winners, their wives, members of the 1958 judging team, sponsors and agricultural leaders were guests of the New England Green Pastures Committee, Harry R. Mitiguy of the Boston Reserve Bank, chairman.

This year marked the 11th Green Pastures Contest and the first time that the event was conducted during the winter barn feeding phase.

SOLUTIONS CODE

(Continued from page 1)

NPFI members called for the following procedure:

1. Each company use its respective trade name.
2. The name be followed by the total nitrogen content in per cent. (Decimal point is omitted.)
3. The name also include, in brackets, the percentage composition, always in the sequence: ammonia, ammonium nitrate, urea, and next, any other significant nitrogen component, all rounded off to the nearest whole number.

Examples:

1. John Doe solution containing 41.2% total nitrogen which consists

of 22.2% ammonia, and 65.0% ammonium nitrate, only:

Code identification would be:

John Doe Solution 412 (22-65-0)

2. John Doe solution containing total nitrogen 44.0%, 28% ammonia, 40% ammonium nitrate, 15% urea.

Coded, it would be:

John Doe Solution 440 (28-40-15)

3. John Doe solution containing 45.5% total nitrogen, 36.8% ammonia, zero % ammonium nitrate, and 32.5% urea.

Coded, this would read:

John Doe UAL 455 (36-0-32)

or

John Doe U 455 (36-0-32)

or simply

John Doe 455 (36-0-32)

The producer might prefer to increase the percentage content of the ammonia from 36.8 to 37.0% and the percentage content of the urea from 32.5% to 33.0% or perhaps, reduce the 32.5% to 32.0% to conform with the code designation. The total ni-

trogen would also change accordingly.

Additional Flexibility:

The code is flexible and should other components besides ammonium nitrate and urea be used, say sulfate of ammonia, the fact could be shown by using the letter S in the trade name and by showing the percentage composition with a 4th digit in the bracket.

If more than one solution contains the same total nitrogen, the composition as shown in the bracket will prevent confusion. In all such cases, the producer always checks with purchaser before shipment, anyway, to avoid mistakes.

Tabatrex Is New Name For Glenn's Repellent

CHICAGO—The Glenn Chemical Co., Inc., Chicago, has announced a slight change in the name of its in-

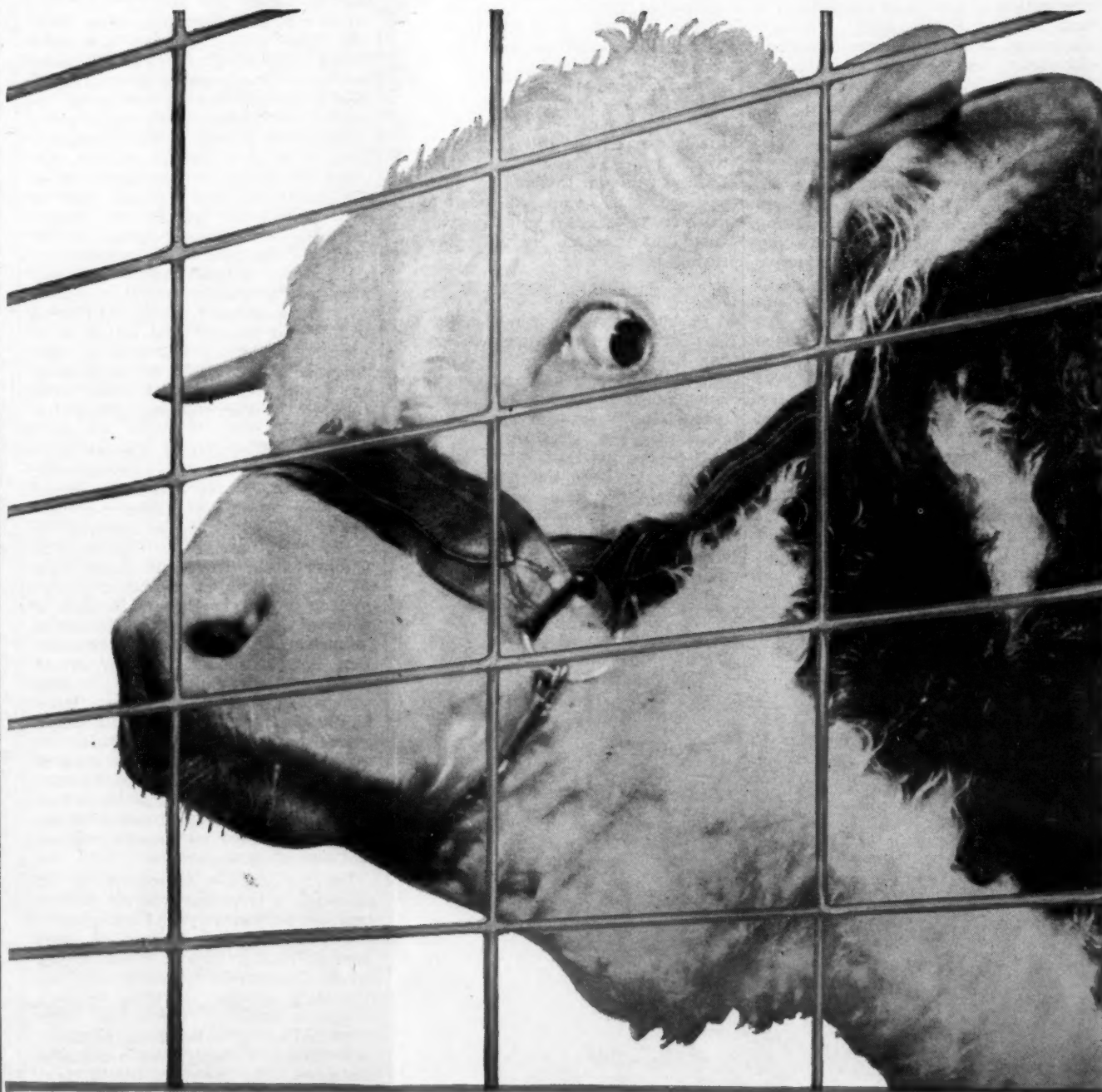
CROPLIFE, Sept. 29, 1958—17

sect repellent, formerly identified as "Tabutrex." Effective on Oct. 1, 1958, the new name for the repellent is "Tabatrex."

Formulators and distributors have been requested by the firm to take note of this change and to revise their advertising, literature and labeling accordingly.

FIELD DAY SCHEDULED

PHOENIX, ARIZ.—About 300 persons are expected Oct. 15 to take part at "Cotton Field Day" of the University of Arizona Cotton Research Center in Phoenix. Dr. E. H. Pressley of the UA plant breeding department has invited Arizonians interested in cotton or cotton research to attend and see the experiment plots and laboratories. Features include a guided tour of the farm and experiments, a demonstration of mechanical cotton picking, and inspection of laboratories.



*"They can fence me in—long as they
give me feed grown in potash-enriched soil!"*

NEWS FOR FERTILIZER MANUFACTURERS—USP offers 3 outstanding grades of potash. There's USP's Higran, a new specially-sized white granular (62/63% K₂O)—and USP's Higrade muriate (also 62/63% K₂O). Both are the purest agricultural muriates now available. And there's USP's Granular muriate which contains 60% K₂O. All three are non-caking and free-flowing throughout and will meet your standards with flying colors.

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FACTORS IN CHEMURGY'S FUTURE

By Dr. Odin Wilhelmy, Jr.

CHEMURGY is a word coined some 30 years ago in this country to describe the application of chemistry and related sciences to the problem of increasing the industrial utilization of agricultural products. By definition, chemurgy encompasses the finding of new nonfood uses for conventional farm crops, the discovery of profitable uses for agricultural residues, and the development of new farm crops as a source of new or existing products.

Interest in the field of chemurgy has fluctuated widely since its inception in the late 1920's. During the period prior to World War II, chemurgy held out a hope of alternative industrial outlets for depression-induced surpluses of farm crops. With the advent of the war and the sharply increased demand for food and fiber, the problem shifted from one of surplus disposal to one of adequate production of materials needed in the war effort. Farm crops, through chemurgy, became a source of certain chemicals, as well as conventional food, feed and fiber products.

Subsequent to World War II, interest in chemurgy sagged as supplies of more economic nonagricultural sources of industrial raw materials such as petroleum and coal again became adequate. Moreover, farmers stepped up their output of food and fiber to keep pace with rising population. By the early 1950's productive capacities of U.S. farms had caught up with demand, and in recent years this country has had mounting surpluses of various farm crops. Once again the U.S. finds itself in an agricultural environment such as gave rise to chemurgy originally, and once again interest in finding industrial outlets for agricultural materials is growing. Evidence of this interest can be seen in: The appointment by President Eisenhower, in 1956, of a "Commission on Increased Industrial Use of Agricultural Products" (which reported its findings to Congress in the spring of 1957); a congressional

bill sponsored by Sen. Homer Capehart (R., Ind.) for a \$100 million "crash" research program in chemurgy; and the inclusion in the proposed 1958-59 federal budget of a request for a substantial increase in research and development funds in this field.

Past Achievements

The foregoing is not intended to suggest that nothing has been accomplished thus far; such is certainly not the case. Research and development groups in both government and industry have done a great deal of productive work in chemurgy that has resulted in hundreds of industrial applications for agricultural products.

However, the surface has only been scratched in this regard, and the full potential of chemurgy is far from being realized. Only 7% of the total cultivated farm acreage in the U.S. is now used to produce items consumed for industrial purposes. The wholesale value of these items represents slightly more than 10% of total cash receipts from farming. At the same time, expenditures for agricultural research in the U.S. (half of which comes from government sources) amount to about 1% of farm cash receipts, compared to an average of 3% of gross sales income invested in research by all manufacturing industry.

Economic Problems

Probably the major reason for the slow growth of chemurgic industries has been the unfavorable economic environment surrounding many technologically sound chemurgic processes. In its interim report to the Congress, the President's commission points out that "some 300 processes have been developed or perfected (in the four regional utilization research laboratories of the U.S. Department of Agriculture) which either await industrial adoption or the proper economic situations to

make them commercially profitable."

It is the purpose of this article to point out some of the economic obstacles that must be overcome by anyone who decides to develop and market an industrial product made from an agricultural material. In general, the problems discussed here are common to all materials of agricultural origin, whether they be surplus foods or feeds, crop residues, livestock by-products, or wastes resulting from food processing or industrial operations based on agricultural materials. The significance of a particular obstacle will vary, of course, with the individual crop or residue concerned.

Assembly of Materials

The first problem encountered in the industrial use of agricultural materials, particularly agricultural residues, is their assembly. Such materials often are widely scattered over a broad geographic area. Most of these materials are also very bulky. One need only think of corn stalks or wheat straw to appreciate the potential cost of gathering together a sufficient volume of a given material to permit its economic conversion to an industrial product. Beyond the initial physical assembly of the material into carload lots or truckloads is the problem of its transportation to a processing point. One simply cannot move a trainload of corn stalks or wheat straw over any significant distance and then expect to process these residues into some useful end product and sell it at a competitive price. The cost of getting the raw materials to the processing point would leave little or nothing with which to pay processing costs.

There are, of course, exceptions to the above general rule. Occasionally, circumstances may cause the bringing together at one location of sufficient quantities of a material to make it economically usable. The Quaker Oats Co. found itself with enough oat hulls at one place to permit their use in the production of furfural, a chemical used in nylon manufacture, and in solvent extraction of petroleum fractions. Meat packing houses and some poultry slaughtering plants, handling large numbers of livestock through a single plant, have found it profitable to make something out of "everything but the squeal." And in recent years, tremendous government stockpiles of various agricultural commodities might be classed as unusual concentrations of materials.

Lacking such a concentration of material, a potential solution to this problem of assembly and transportation lies in the technique of local semiprocessing. This solution might involve compressing, extracting, dehydrating, cooking, distilling, or even a simple chemical treatment. Such processing might be done adjacent to or in a farm field, using a portable semiprocessing plant mounted, perhaps, on a railroad car or a truck bed. A cannery, during the off-season, would be another possible mechanism for this job. Local semiprocessing is certainly not an unknown concept. It is highly developed in the fishing and whaling industries where bulk and weight are reduced, and spoilage prevented, by semiprocessing the product on the ship at the fishing grounds.

In many instances, the production of an industrial product from an agricultural raw material may require the use of a process differing significantly from processes previously used. If such is the case, a processor, in order to utilize such a raw material, may find it necessary to make major changes in an existing plant or to build an entirely new plant.

Should a processor take this step and build the necessary plant, he

EDITOR'S NOTE: Dr. Wilhelmy is on the staff of Battelle Memorial Institute, Columbus, Ohio, and presented this report originally in the *Battelle Technical Review*. Since he joined the Battelle staff, Dr. Wilhelmy has participated in numerous agricultural economic studies both in this country and in Latin America.

would still face two additional major risks, for reasons that will become evident shortly. One of these would be a disappearing market for his product; the other, a disappearing or inadequate supply of the agricultural raw material on which the process is based. Under such circumstances, it is only reasonable that a person taking such risks would expect a definite incentive for doing so, plus some assurances that his position would be protected once he had assumed the risks. The best assurance in this regard would be concrete evidence, in advance, that the process being exploited had a good chance of becoming economically self-supporting within a reasonable period of time.

Price Stability

Prices of chemicals, pharmaceuticals, and other industrial products that could logically be made from agricultural raw materials are traditionally quite stable. In fact, the successful and continuing sale of such products to industrial or consumer markets rests in large part on this relative price stability. Agricultural products, on the other hand, are notoriously unstable in price, fluctuating from day to day or season to season depending on the commodity concerned.

Thus, the problem involved in producing a stable-priced product from an unstable-priced raw material must be faced. The problem is particularly clear-cut when one compares agricultural commodity prices with those of petroleum or coal, the relatively stable-priced raw materials that are and will be the primary competitors of agricultural materials.

Supply of Materials

Paralleling this problem of price instability is another one of equal seriousness in the eyes of the processor—that of instability and uncertainty in the supply of the agricultural raw material. There are several facets to this problem. In one case, a manufacturer may be depending for his raw material supply on the production of that commodity in a given geographic area. It is not difficult to imagine weather conditions that would wipe out a crop or so reduce its volume that his operation would be left stranded.

In another instance, a processor might build a plant and go into business on the strength of stores of an agricultural commodity that had been stockpiled from previous seasons. Again it is not difficult to imagine circumstances that would leave him without an adequate raw material supply once the initial stockpiles had been used up. There may be other situations in which the supply of a material may initially be adequate, but unforeseen future events may cause it to shrink. For example, the current supply of coffee grounds in the U.S., resulting from the manufacture of instant coffee, is perhaps 250,000 tons per year. There is evidence, however, that instant coffee production may be shifted to Central and South America to save transportation costs. Should the entire instant coffee industry take this step, there would be no coffee grounds available in this country as a by-product of its manufacture.

A similar example can be cited in the case of imported tung oil, an important ingredient of paints in this country prior to World War II. Imports of this oil in 1940 amounted to 97,049,000 lb. Three years later, imports were only 68,000 lb., since trade with China had been cut off by the war. U.S. paint manufacturers turned



CHECKING COTTON PEST CONTROL—Ed Jones, manager of O. F. Bledsoe Plantation, Greenwood, Miss., second from left, discusses cotton pest control with three representatives of Hercules Powder Co., sponsors of a season-long spray program in which the plantation participated. From left to right, members of the group are: P. J. Reno, Wilmington, Del.; Mr. Jones; Dr. K. P. Ewing, Hercules entomologist; and W. Coleman Edgar, Wilmington. The Bledsoe plantation, established in 1849, is one of the oldest in the area. It had 1,136 acres of cotton in the pest control program. The crop was planted May 15-19, and received five early applications and nine late season applications, at a total chemical cost of \$14.23 an acre, according to Mr. Jones. He said the early applications were of toxaphene alone, and the remainder a mix of two parts toxaphene to one part DDT. The plantation owns five sprayers which cover the entire acreage in three days. In each application, the sprayers went down the same rows to minimize wheel damage to the plants. The Bledsoe plantation was one of many in three states inspected by touring press, radio, and television men Sept. 16-18. (See *Crop-life*, Sept. 22, page 8.)

to other oils and their modifications as replacements for tung oil. In a case such as this, the solution to the problem may lie, at least in part, in concentrating, preserving and stockpiling the crop or residue in question to assure an adequate future supply.

Another aspect of this over-all supply problem that is even more difficult to control is the variability in the quality or composition of the raw material. Variability is inevitable in materials of biological origin, and this aspect of the problem could be fully as important as supply per se unless the production process has enough flexibility to permit the use of materials across a broad composition or quality range.

The ability to use an entire commodity is less frequent in cases where conventional crops or livestock products constitute the raw material of the chemurgic process than when residues are being used. Many of these conventional crops or livestock products such as corn, wheat and milk form a natural and complete unit in themselves and are ideal for food or feed purposes. However, when they serve as the bases for manufacturers, rarely, if ever, can the entire natural products be used. The products must be separated or split into their individual components to make them industrially useful.

The splitting process adds to production costs and, at the same time, usually results in the creation of some new waste material that must be disposed of. A prime example of this can be found in the industrial utilization of skim milk. This product, a wholesome and useful food, can be readily split into its two primary components—casein and lactose or milk sugar. There is a ready industrial market for casein, mainly in the sizing of paper. Lactose, on the other hand, is severely limited in its industrial applications because many of the products that may be manufactured from lactose can be made more economically from cheap and abundant sucrose.

Problem of Quality

In some cases, an industrial product made from an agricultural raw material may be inferior in quality to that producible from petroleum or coal or by means of some other synthetic organic chemical process. Perhaps the best examples of this can be found in the industries using oils of agricultural origin. In recent years, latex emulsion paints, based on non-agricultural ingredients, have made significant inroads into paint markets that formerly were the domain of oil-based paints originating from agricultural sources. This is particularly true in the case of interior finishes. The latex paints gained their position because they were found to have some important quality advantages over paints made from agricultural oils. Similarly, synthetic resin-based printing inks have been developed that permit higher speed printing operations than were previously possible with oil-based inks.

The answer to this problem, while perhaps not readily achievable, at least is readily recognizable—improve the agriculturally based product until it is equal or superior to the synthetic product. Chemical modification of the agricultural oils has been found effective in upgrading the quality of paints based upon them. Or, borrowing the philosophy of "If you can't beat 'em, join 'em", an agricultural oil can be combined with a synthetic material to yield a superior product. The success of alkyd flat interior enamels, made principally from soybean oil and certain chemicals, is a striking example of such a process. Admittedly, such modifications or additions add to production costs, but they certainly seem justifiable if the resulting product is marketable at a price high enough to cover production costs.

Price Competition

As indicated, price competition from products of nonagricultural

origin is another problem that may have to be overcome in establishing a chemurgic product. Assuming that a high quality product can be made from agricultural materials, one may still face the problem of being unable to compete price-wise with products derived from nonagricultural sources. Numerous examples could be cited of chemicals that can be produced equally well from grain or from petroleum, none of which is being made from grain because of unfavorable economics. Similarly, one can cite the remarkable growth in the use of tall oil (a by-product from the manufacture of paper by the sulfate process) as a paint ingredient in place of other semidrying or drying oils of agricultural origin. Some years ago tall oil's poor quality made it unattractive as a paint constituent, in spite of its low price. However, through research, its quality has been upgraded to the point that it is a strong competitor of more expensive oils in a number of paint-manufacturing applications.

Support Program Effects

One final factor affecting the progress of chemurgy that should be mentioned is the price-support phase of the federal farm program. Regardless of one's attitude, one must agree that price supports tend to discourage the use of agricultural products.

Farm price supports are designed to keep the prices of certain agricultural commodities at a level higher than they would otherwise be. This situation in itself discourages the use of farm products as industrial raw materials, since raw material price is a prime factor in the economic feasibility of such chemurgic operations. Price supports also discourage shifts from the growing of what are now surplus crops to the production of new crops that might prove valuable as industrial raw materials. Finally, price supports tend to encourage overproduction of the supported crops, thereby reducing the chances of using up existing and future farm surpluses in industrial markets. Thus, one goal of chemurgy—balancing agricultural production and consumption—is made more difficult to achieve.

One obvious solution to this problem is to find and use some mechanism other than price supports to protect the farmer from economic catastrophe. So long as agricultural commodities are price-supported, the finding of industrial uses for those commodities will not in itself eliminate the problem of farm surpluses. Chemurgic applications may increase the total demand for a given crop, and the surplus of a crop in any one year may thus represent a smaller percentage of that crop's total production. However, the likelihood of a surplus would not be significantly reduced from what it was before the chemurgic use entered the picture as an additional market.

Program Considerations

A program of action suggested to overcome these and other obstacles to the progress of chemurgy has been spelled out in detail by the President's commission in its report to Congress. The suggestions made here in general merely echo or highlight the recommendations made in that report.

Action logically divides itself into two distinct phases—immediate steps to get more promising laboratory-proved processes and products off the shelf and into commercial production, and a longer range effort to explore and expand chemurgy beyond its present limits. "Incentives" and "education" are key words in the first of these phases. It has been proposed that if any significant share of the 300 processes now ready for commercialization are to achieve that status, specific and tangible incentives must be offered to farmers, to the railroads, to processors and to others that would be instrumental in making and keeping a given commercial

process profitable. These incentives, it is pointed out, could take several forms, including credit, rapid amortization, favorable changes in legislation, tax advantages and freight subsidies—but they must be present if action is to be forthcoming. Concurrently, there would be education—of the farmer, the railroads, industry, and the ultimate consumer—to show these people the potential benefits that will accrue to them if a given chemurgic process is commercialized.

Care must be exercised in the use of incentives, however, if distorted economic situations in some industrial uses of agricultural materials are to be avoided. The incentives chosen to stimulate the commercialization of a given chemurgic process must be tailored in each instance to the individual problem. Secondly, incentives should be used as a stimulant only where needed and only for those processes that hold definite promise of being able to stand on their own feet technically and economically within a reasonable period of time. Finally, it must be clearly understood at the outset by all parties concerned that these incentives were being offered only as temporary props and would be withdrawn when a given chemurgic process has been proved profitable in its own right, or as soon as it becomes evident that such a status is not achievable. Similar incentives have been used in the past to help various mining and manufacturing industries overcome initial economic obstacles and, if properly understood and applied, might help new chemurgic processes get established.

Over the longer range, additional research might well supply logical answers to some of the obstacles confronting chemurgy. Such research should have a broad approach, ranging from studies of the properties and values of plants not now grown commercially, to the development of equipment such as a portable semi-processing device for converting cornstalks into a liquid concentrate. Likewise, such research would best be both technical and economic, with perhaps more emphasis on economic research since relatively less work has been done on this aspect of the problem than on technical aspects. Two specific programs would seem to be logical: (1) A careful screening of the many recommendations of the President's commission to determine those that are most promising both technically and economically; and (2) a comprehensive survey of chemurgic raw materials in the country to determine their volume and location and their relative ease of assembly.

Attainable Benefits

The possible benefits attainable

from the successful prosecution of the above program of action are fourfold. One of the immediate benefits, potentially, of finding new industrial markets for conventional farm crops would be to relieve the federal government of some of the burden and expense that it now carries in its farm price-support program. If a portion of existing accumulations and future surpluses of farm crops can be sold to industrial markets, the cost to the government of buying, handling, storing and disposing of these crops could be significantly reduced. Likewise, insofar as industrial markets succeeded in reducing these surpluses, their depressing effect on prices of various crops in conventional markets would also be reduced.

Secondly, the development of profitable industrial markets for agricultural wastes or residues would provide farmers with an additional source of income and would contribute to the strength of the over-all farm economy. Thirdly, increased know-how and facilities for using agricultural materials to make industrial products would be a valuable standby resource in the event of future national emergency or shortages.

Finally, it must be recognized that the farmer would by no means be the only one to benefit from successful chemurgic activities. Financial benefits would also accrue to those who processed the crops or residues into industrial raw materials, to the manufacturers who used these materials to make other products, to the railroads or truckers who transported the raw materials or finished products, and to others. It may be reasonable to hope that new industries, new employment and new wealth would all be created.

Conference Theme Selected

MEMPHIS, TENN.—The theme of the 1958 Beltwide Cotton Production Conference will be "cotton in an efficient agriculture," the National Cotton Council reported.

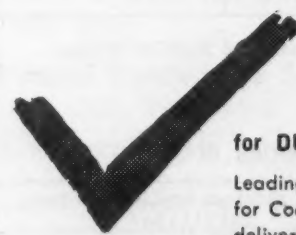
The conference will be in Houston, Dec. 17-18, at the Rice Hotel. Subjects to be discussed by various authorities include insect control, fertilization, weed control, cotton quality, obtaining vigorous stands, taking gossypol out of cotton, cotton production in Russia, and cotton and the weather.

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FERTILIZER USE

(Continued from page 1)

land, Connecticut, New Jersey, Delaware, North Carolina and Florida, reported that all of their harvested potato acreage receives fertilizer, and 90% or more are reported fertilized in New Hampshire, Vermont, New York, Pennsylvania, South Carolina and California. As with most of the other crops, highest percentages of the acreage fertilized are in the eastern and the Pacific Coast States and the least on the Great Plains.

Nitrogen application rates to the fertilized acre are highest in the Northeast, the Southeast, the Pacific Coast States, Ohio, Utah and Nebraska.

Quantities in excess of 100 lb. of P_2O_5 to the fertilized acre are used throughout the Northeast, the Southeast, and over portions of the Pacific Northwest and in irrigated areas of the Mountain States.

Potash applications per acre are highest in the Northeast, Ohio, Indiana, Michigan, the Southeast, northern Missouri, and in the humid areas along the Pacific Coast. Potash use is negligible throughout the Great Plains and Mountain States.

Table 2 compares fertilizer use in major commercial potato producing areas of the United States for which estimates are available. The most intensively fertilized area is Aroostock County, Maine. Least fertilized are the areas in Red River Valley of

North Dakota and Minnesota, and in Idaho.

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NEXT WEEK

Part 8 of this series will review the crop-use pattern of fertilizer on tobacco in the states where this crop is grown. The authors say that 97% of the harvested tobacco acres receive fertilizer, and next week's article will break down this statistic by states and regions.

FIGURE 1. The percent of harvested acreage fertilized for potatoes during 1954.

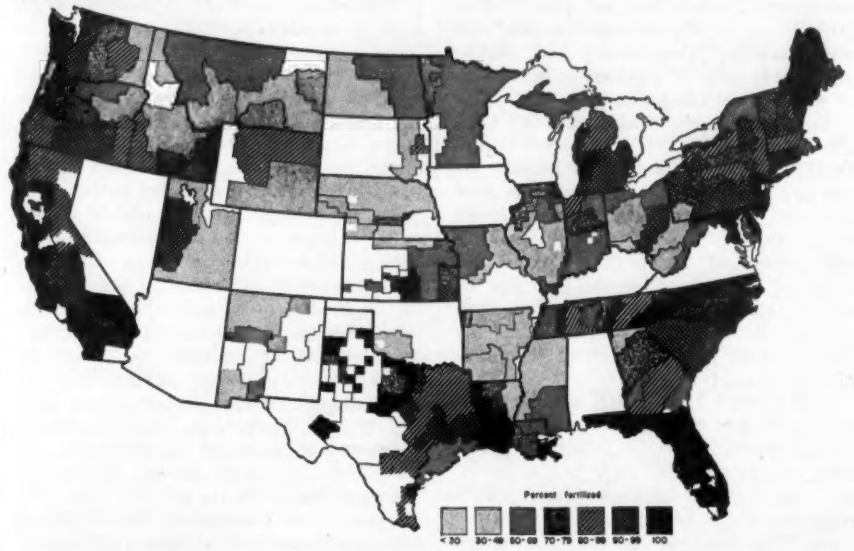


FIGURE 2. The estimated rates of N used per fertilized acre for potatoes during 1954.

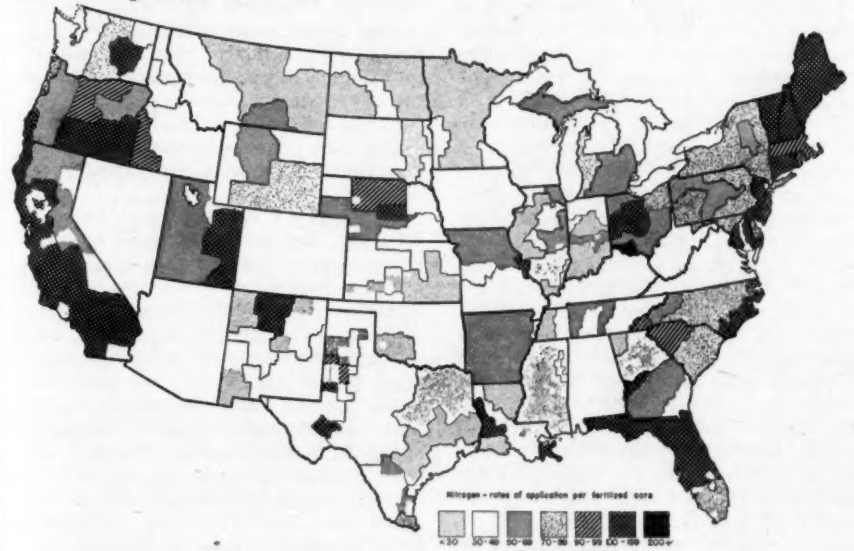


FIGURE 3. The estimated rates of available P_2O_5 used per fertilized acre for potatoes during 1954.

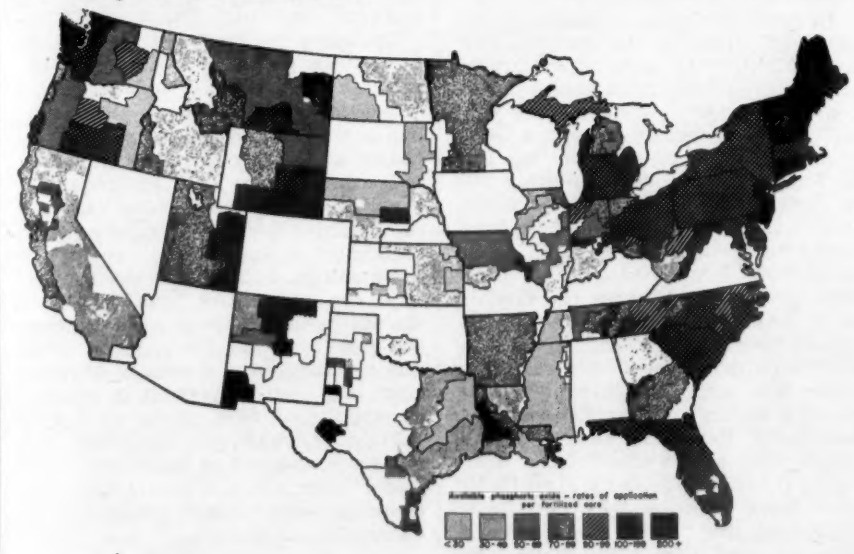


FIGURE 4. The estimated rates of K_2O used per fertilized acre for potatoes during 1954.

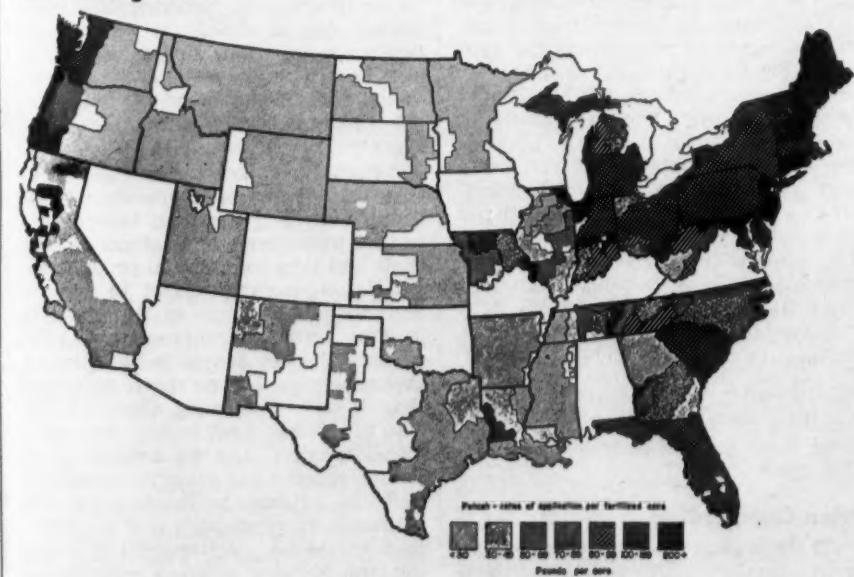


TABLE 1. Potatoes¹; Acreage harvested and percent fertilized, and estimated use of fertilizer and primary plant nutrients, by states, 1954.

State	Total acres harvested (4)	Harvested acres fertilized ⁽¹⁾ Percent	Fertilizer applied ⁽²⁾ 1,000 tons	Rate of application of nutrients per fertilized acre ⁽¹⁾		
				Nitrogen	Available phosphoric oxide	Potash
	1,000 acres	Percent	1,000 tons	Pounds		
Arkansas	6	25	.7	54	80	40
California	94	97	67.4	125	43	13
Connecticut	6	100	—	150	200	200
Delaware	6	100	5.9	79	157	157
Florida	32	100	33.0	110	167	158
Georgia	2	63	.3	40	3/ 48	47
Idaho	150	62	11.6	46	42	1
Illinois	2	52	.2	37	44	47
Indiana	7	74	2.7	41	88	261
Kansas	1	66	.1	33	37	3
Louisiana	7	80	1.7	39	56	32
Maine	130	100	139.8	140	225	261
Maryland	5	80	2.7	148	181	225
Massachusetts	6	88	6.1	94	185	185
Michigan	53	86	21.7	59	112	138
Minnesota	80	66	7.4	24	79	24
Mississippi	3	32	.2	32	22	22
Missouri	3	28	.2	58	63	75
Montana	8	45	.4	32	61	0
Nebraska	19	28	.6	59	39	5
New Hampshire	2	92	1.9	132	262	262
New Jersey	22	100	23.9	100	200	200
New Mexico	1	25	<.1	32	75	21
New York	88	90	—	71	142	146
North Carolina	23	100	—	95	124	100
North Dakota	94	63	4.6	13	38	24
Ohio	20	57	7.5	75	105	103
Oklahoma	2	5	<.1	20	40	20
Oregon	37	87	9.6	98	77	29
Pennsylvania	53	91	29.4	72	157	148
Rhode Island	4	100	3.0	95	189	189
South Carolina	6	99	5.7	89	178	134
South Dakota	9	38	.3	17	19	19
Tennessee	8	81	2.6	42	83	75
Texas	13	87	2.0	56	35	14
Utah	9	42	1.1	67	85	0
Vermont	3	96	2.2	104	224	241
Washington	25	78	6.6	80	102	50
West Virginia	10	38	1.7	37	86	78
Wyoming	5	68	—	3/ 32	82	12

¹ Excluding sweetpotatoes.

² Estimates based on data from Soil and Water Conservation Research Division, U. S. Department of Agriculture.

³ Revised.

TABLE 2. Fertilizer use in major potato growing areas during 1954.

State and area	Acreage fertilized Percent	Nutrient application per fertilized acre			
		Nitrogen	Available phosphoric oxide	Potash	Total
	Percent	Pounds			
Maine, Aroostock County	100	141	225	262	628
New York, Long Island	100	71	142	146	359
Pennsylvania, Southeastern	98	76	162	152	390
Florida, Southern	100	71	150	128	349
Minnesota, Red River Valley	75	25	79	25	129
North Dakota, Red River Valley	65	13	38	25	76
Idaho, Idaho Falls area	61	40	37	0	77
California, Lower Sacramento Valley	98	121	42	13	176

CANADIAN MEETING

(Continued from page 1)

who are interested in chemical weed control, and in particular the weed chemical industry, should benefit greatly from a thorough survey of weed species and populations on the crop lands of Canada and from studies on the competitive ability of the more dominant species. The extent to which new weed control chemicals will be marketed cannot be divorced from the distribution and seriousness of the weeds they control, he said.

Mr. Fox suggested that some of the more obvious requirements for successful insect control, in addition to an efficient insecticide are: adequate evaluation of new productions, sound promotion and publicity, through education of the public and extension workers, as well as correct and honest labeling.

"A fundamental knowledge of the pest, its biology, habits, vulnerability, its parasites and predators, as well as the effect of spraying upon associated insects and upon associated wildlife is required for successful long term insect control work," he said.

"It has long been evident that better and more up-to-date statistics regarding the economic importance of insects are required. Better information should be available as to predicting and estimating populations, as well as determining the economic thresholds at which insect control would be justified to produce economic returns. Besides accurately evaluating the losses caused by insects, the value of savings resulting from insect control should be more precisely determined," he pointed out.

In his opinion, more consideration should be given to so-called marginal or sub-epidemic types of infestations. "I would suggest that an effective and consistent preventive program of insect control would not only supply valuable information on the less prominent types of insect attack, but also likely would yield substantial returns."

In his keynote address, J. H. Elliott, newly-elected president, examined the progress of the association in its six years of existence.

"Perhaps we can say that our association is at the end of its probationary period. I suggest we should examine the strengths and weaknesses in CACA in the interest of making constructive suggestions for the future."

He then outlined three ways which this examination could be brought about:

1. Review CACA's performance to date.
2. Discuss what a trade association can and cannot expect to do.
3. Each member ask himself how CACA can do a better job in the future.

In summing up, Mr. Elliott urged the support of those operating on a local or regional basis to enable the association to deal effectively with regional problems.

Another featured speaker on the program was R. B. Marr, who discussed the relationship of the petrochemical industry to the agricultural chemical industry.

Mr. Marr pointed out that as raw material bases, petroleum chemicals are becoming increasingly important in the manufacture of agricultural chemicals. He then noted figures which showed that petroleum-based chemicals now constitute about 30% of all pesticides and a larger portion of ammonia and some sulphur for fertilizer production.

Mr. Marr then went into the po-

tentialities of the petroleum chemical industry in Western Canada.

"The tremendous potential for petrochemicals generally is pointed out by the fact that in North America, only 2% of the oil and natural gas produced is used in the manufacture of petrochemicals. In this industry the surface has barely been scratched and the future for it is one that we can scarcely imagine. There is much reason to believe that this industry of agricultural chemicals will continue to an ever-increasing extent to join us in the West and help build the giant agricultural industry of tomorrow," he concluded.

G. H. Neilsen participated in a panel discussion on the problems of the agricultural chemical industry as seen by the manufacturer.

Important points covered in the discussion included:

1. While \$21 million worth of agricultural chemicals are distributed annually in Canada, only part of this is produced here.

2. The Canadian manufacturer shares the market on these tariff-free products with large companies in other countries. The resulting low volume of production, together with serious inventory problems caused by the widely-separated markets and the seasonal demand for herbicides, insecticides, fungicides and growth regulants, restrict the production of agricultural chemicals in this country and also limit the amount of research which is done here.

3. The availability of further statistical information to assist in forecasting Canadian sources for more of the raw materials required, and some measure of tariff protection would have a favorable effect on the production of agricultural chemicals in Canada.

"Weather Forecasting and its Application to Agriculture" was the subject of a speech given by B. W. Currie of the University of Saskatchewan.

Mr. Currie said, "Notable advances have been made in providing 15 and 39-day forecasts—particularly by the United States Meteorological Services. While they are mostly qualitative—referring to expected differences from the average temperatures and precipitations by the use of expressions like abnormal, subnormal and so on—they do help the farmer and people providing services to the farmer to plan their operations."

"Improvements in these forecasts may be expected in the next few years—especially if artificial satellites can be used to collect weather data from large areas of the earth's surface not presently served by weather stations," he said.

Mr. Currie felt far more use should be made of climatic data in planning farm operations and services over a period of years.

J. C. Gilson, department of agricultural economics, University of Manitoba, discussed problems and adjustments for Western Canadian agriculture.

"One of the most important problems in western agriculture is one of price, production and income instability. Stability of income is just as important as level of income to farmers. Farmers can never be sure of when their income may be cut in half from one year to the next. The consequences of farm instability are just as important to industries supplying the farm industry with goods and services as to the farm families themselves," he said.

Continuing, Mr. Gilson listed "the disparity of income which exists between agriculture and the rest of the economy," and the factor of the "price-cost squeeze" which has "ex-



J. H. Elliott

NEW CACA PRESIDENT—J. H. Elliott was elected president of the Canadian Agricultural Chemicals Assn. at the group's sixth annual meeting in Winnipeg. Mr. Elliott has been serving the association in various offices for the past four years. He also has been a member of the group's board of directors during that time. He was born on a farm in Victoria County, Ont., and attended a rural public school and high school in Fenelon Falls. After graduating from Ontario Agricultural College in 1950, he joined his present firm, Rohm & Haas Co. of Canada Ltd., and helped initiate its sales program on agricultural chemicals.

isted since 1951" as other problems which were of vital importance to the industry.

"The nation has a stake in the welfare of the agricultural industry," Mr. Gilson said. "A depressed agriculture is a millstone around the nation's neck. Farming people do not want relief, subsidy and handouts. They want, for the most part, equality of opportunity. They should have the opportunity to meet the challenges of their occupation and to make a living on the same footing as the rest of the economy."

"New and Proven Sales and Advertising Techniques Applicable to Agricultural Chemicals" was the title of a paper delivered by John Burke-Gaffney.

Mr. Burke-Gaffney pointed out the purpose of advertising, some of the basic appeals used in advertising and sales and then outlined the "Diffusion Process" in advertising.

"Some farmers will try any new idea that comes along," he said, "while others will accept an idea only after it is proven in their neighborhood. Some ideas and practices are accepted quickly and with little apparent effort, while others are accepted after years of effort on the part of government and industry."

Mr. Burke-Gaffney felt that to become acquainted with these farmers that try the idea as soon as it comes along, and use them to "lead" the others into accepting the idea, was the most important element in the selling process.

Chemical Conference Set

SAN JOSE, CAL.—The annual Northwest Agricultural Chemicals Industry Conference has been scheduled for Jan. 21-22, 1959, at the Benson Hotel, Portland, Ore., according to an announcement made recently by C. O. Barnard of the Western Agricultural Chemicals Assn. George Kitzmiller of the Pacific Cooperatives has been named chairman of the conference.

NEW RESEARCH BUILDING

CINCINNATI, OHIO—William S. Merrell has completed a new \$1 million, 14,000-sq.-ft. laboratory for organic chemistry research and radioisotope work here.

New Process for Nitrogen Manufacturers Announced by Allied

NEW YORK—Nitrogen Division, Allied Chemical Corp., has developed a new process that will enable fertilizer manufacturers to make high-nitrogen mixed goods without the use of dry nitrogen materials. Using only nitrogen solutions, manufacturers will be able to make mixed fertilizers with a nitrogen content as high as 16%.

The new ammoniation technique, developed at Nitrogen Division's central research facilities in Hopewell, Va., involves the use of sulphuric acid with selected Nitrana nitrogen solutions. The process, which is continuous, can be used by fertilizer manufacturers who have granulating equipment. A certain amount of new equipment, plus modification of standard ammoniating apparatus, is necessary, the Division explained.

Nitrogen Division says it will offer the process to fertilizer manufacturers at no cost. Operating techniques, with guides as to type of solution, strength of acid, temperatures and other factors, have been worked out, the Division said. Nitrogen Division technical servicemen are available to assist with design and operation.

Several fertilizer manufacturers are planning to install equipment for the new process, the Division announced, and will produce such grades as 14-7-7, 16-8-8, 14-0-14 and 15-10-10.

International Manager Gets Twenty-Five Year Merit Pin

CHICAGO—E. Meade Wilson, manager of International Minerals & Chemical Corp.'s plant food operations in Florida and southern Alabama, was awarded a 25-year merit pin at a meeting of area managers in the company's new administrative and research center in Skokie, Ill. The presentation was made by John D. Zigler, general manager of the plant food division.

Mr. Wilson joined International as a field representative in Florida in 1933, and was promoted to field manager, and later district sales manager.

As area manager since 1952, he is responsible for sales, and also supervises International's fertilizer plants at Pensacola, Jacksonville, and Mulberry, Fla.



IMPROVED BAG—Bemis Bro. Bag Co. has developed what it considers a new concept in bag construction, a single-gusseted valve for its multi-walls. The Bemis single-gusset, as pictured and containing granulated fertilizer, is supposed to stack in less space. Main advantages as outlined by the makers, include additional usable space due to the flat tube side, more room for product flow during filling, and reduction of blowouts. Also, the new bag is designed to keep products fed into it from backing and clogging the filler spout, thereby reducing packaging time and labor.

Croplife

A WEEKLY NEWSPAPER FOR THE FARM CHEMICAL INDUSTRY

The regional circulation of this issue is concentrated in the Northeastern states.

U.S. MATERIALS IN KEY ROLE . . .

World-Wide Use of Pesticides Aids Farmers

ONE of the little-known aspects of U.S. foreign aid—the technical assistance in insect control given to countries of the Middle East, South Asia, and Africa—is paying dividends in world-wide plant protection, the U.S. Department of Agriculture reports.

Seven years (1951-57) of this work in 13 countries have demonstrated its value in helping to combat hunger, malnutrition and poverty through controlling crop pests.

Training of foreign agricultural leaders and farmers in the use of modern insect-control weapons, primarily through demonstrations including aerial dusting and spraying, has improved crop yields in the aided countries, helped to raise their living standards, and fostered united action and understanding among the nations involved.

First came control of the desert locust (grasshopper), which has periodically brought famine to areas around the Mediterranean since Biblical times. Help has been given also in combating other insect destroyers of food supplies.

The work has strengthened plant-protection organizations in the 13 countries, resulting in a general advance of entomological research and the establishment of effective plant quarantines and pest-control programs.

Increased knowledge of the world's insects obtained in this international effort has helped to arm farmers everywhere against possible foreign pest invasions of the future. Introduction of modern large-scale methods of pest control in the program areas has opened up new markets for U.S.-produced pest-fighting equipment and materials.

As financial support by local governments in these areas has increased, the need for U.S. dollar support for pest-control assistance in these countries has dropped off. Today the countries benefiting from the program put \$13 of their own money into this work for every \$1 spent by the U.S., according to the USDA.

The International Cooperation Administration furnishes funds, and USDA carries out the "here's-how" insect-control program. U.S. assistance is withdrawn as soon as enough key local people in a country are trained to carry on their own insect-control and plant-protection work.

Nine entomologists, a plant-quarantine specialist, and four airplane pilots of USDA's Agricultural Research Service are now at work in eight countries—Afghanistan, Ethiopia, Iran, Iraq, Lebanon, Libya, Pakistan and Tunisia. Assistance has been given previously to Egypt, India, Jordan, Morocco and Turkey. Meanwhile, the Food and Agriculture Organization (FAO), under the United Nations technical assistance program, is providing leadership in locust control measures—largely ground operations—to Saudi Arabia and some other countries. The new programs supplement and strengthen each other.

In the first year of the U.S. program (1951), a USDA entomologist worked in three countries on the desert locust, supervising work to which the U.S. contributed \$567,000. In 1957, nine American technicians worked in 10 countries on dozens of insect pests at a cost to the United States of about \$300,000.

Since 1951, USDA's technical assistance workers assisted in demonstration projects under which almost 400,000 acres have been treated with in-

secticides to show foreign agricultural leaders and farmers how to combat 85 different insects attacking 37 crops.

The USDA workers have demonstrated insect survey techniques, insecticidal seed-treatments, methods for controlling weeds and stored-grain and livestock pests, and cultural practices that cut insect numbers. They have trained almost 300 plant-protection technicians, 83 airplane pilots and 65 airplane mechanics in safe application of pesticides and in other insect-control methods. Thirty plant-protection trainees have been sent to the United States.

In 1957 a plant quarantine specialist joined the USDA staff headquartered at Beirut, Lebanon. Upon request, he advises governments and trains personnel in developing and enforcing laws to protect their agriculture against destructive insects and plant diseases. New or modernized plant-quarantine laws that he has helped to draft are on their way toward enactment in Turkey, Afghanistan, and Ethiopia. He has trained inspectors to recognize and bar foreign plant pests at ports of entry.

Pyrilla of sugar cane, senn pest of wheat, the spiny bollworm of cotton, the date leafhopper, the olive fly, and many other pests not found in the United States are now under study and attack in the Middle East. Knowing the looks and habits of these pests can help plant-quarantine inspectors the world over to keep them out of uninvaded countries. Learning how to kill them arms farmers against the pests wherever they invade crops.

While U.S. research results are the basis for most of the work in these areas, local pests raise problems that only local research can answer. Entomological research is on the increase. For example, in Iran a biological control and research laboratory has been established by the Iran Ministry of Agriculture which will serve also as a training center for native college graduates in the plant-protection field.

Time-payment plans have made it possible for small growers to buy much of their own pest-control equipment. In the past seven years, these countries have imported 93 spray airplanes, 326 trucks, 1,129 power applicators, 19,826 hand applicators and 643 other pieces of pest-control equipment, plus 3,777 tons of some 50 different agricultural pesticides, largely from the United States.

To many a Middle Eastern farmer, pest control has meant the difference between hunger and a full stomach, USDA technical assistance workers say. In Malir, Pakistan, the selling price of a mango grove badly infested with leafhoppers went from 600 to 15,000 rupees—a 2,500% increase—after it was used as a demonstration area in 1955.

An excellent spirit of international cooperation has developed among the participating countries. Materials, equipment, and personnel have been shifted from one country to another as needed to destroy migratory hordes of locusts, reports say.

By working together to fight winged insect enemies that know no international boundaries, the countries have proved the value of mutual aid, exchange of information, and development of advanced techniques in combating pests. At the same time, the program has fostered national self-confidence and pride of accomplishment in all the countries.



Croplife's Home Office

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CROPLIFE is a controlled circulation journal published weekly. Weekly distribution of each issue is made to the fertilizer manufacturers, pesticide formulators and basic chemical manufacturers. In addition, the dealer-distributor-farm adviser segment of the agricultural chemical industry is covered on a regional (crop-area) basis with a mailing schedule which covers consecutively, one each week, four geographic regions (Northeast, South, Midwest and West) of the U.S. with one of four regional dealer issues. To those not eligible for this controlled distribution Croplife subscription rate is \$5 for one year (\$8 a year outside the U.S.). Single copy price, 25¢.

LAWRENCE A. LONG

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DONALD NETH

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Published by

THE MILLER PUBLISHING CO.

2501 Wayzata Blvd., Minneapolis, Minn.

(Address Mail to P. O. Box 67, Minneapolis 40, Minn.)



Associated Publications—The Northwestern Miller, The American Baker, Farm Store Merchandising, Feedstuffs, Milling Production.

MEETING MEMOS

Oct. 22-24—Second National Conference on Agricultural Meteorology, Connecticut Agricultural Experiment Station and Forestry School of Yale University, New Haven, Conn.

Meeting Memo listed above is being listed in this department this week for the first time.

Oct. 1—Field Day, Eastern Virginia Research Station, Warsaw, Va.

Oct. 2—New Jersey Fertilizer Conference, Rutgers University, New Brunswick, N.J.

Oct. 13—Agricultural Research Institute Panel on Problems Related to Agriculture in the Fertilizer Producing Industry, Academy of Science Bldg., Washington, D.C.

Oct. 13-15—Association of Official Agricultural Chemists, Shoreham Hotel, Washington, D.C.

Oct. 14-15—Western Agricultural Chemicals Assn., Annual Meeting, Villa Hotel, San Mateo, Cal., C. O. Barnard, 2466 Kenwood Ave., San Jose 28, Cal., Executive Secretary.

Oct. 16—National Plant Food Institute Conference on Chemical Control Problems; Shoreham Hotel, Washington, D.C.

Oct. 17—Association of American Fertilizer Control Officials, 12th Annual Meeting, Shoreham Hotel, Washington, D.C., B. D. Cloaninger, Box 392, Clemson, S.C., Secretary-Treasurer.

Oct. 19-22—Soil Conservation Society of America, 13th Annual Meeting, City Auditorium, Asheville, N.C.

Oct. 20—Annual Sales Clinic of Salesmen's Assn. of the American Chemical Industry, Inc., Roosevelt Hotel, New York.

Oct. 20-21—Fertilizer Section, National Safety Council, annual fall meeting, La Salle Hotel, Chicago, Ill.

Oct. 21-24—Stored Grain Insect Control Conference, Kansas State College, Manhattan, Kansas.

Oct. 22-24—Pacific Northwest Plant Food Assn., Annual Meeting, Gearhart, Ore., Leon S. Jackson, P.O. Box 4623, Sellwood-Moreland Station, Portland, Ore., secretary.

Oct. 27—Western Range Fertilization Conference, Riverview Country Club, Redding, Cal.

Oct. 27-30—The American Forestry Assn., 83rd Annual Meeting, Gearhart, Ore.

Oct. 28-29—American Society of Range Management Meeting, Riverview Country Club, Redding, Cal.

Oct. 28-29—Northwest Garden Supply

Trade Show, Masonic Temple, Portland, Ore.

Oct. 29-30—Annual Southeastern Soil Fertility Conference, Atlanta Biltmore Hotel, Atlanta, Ga.

Oct. 29-31—National Agricultural Chemicals Assn., 25th annual meeting, General Oglethorpe Hotel, Savannah, Ga.

Nov. 5-7—Fertilizer Industry Round Table, Mayflower Hotel, Washington, D.C.

Nov. 9-11—California Fertilizer Assn., 35th Annual Convention, Ambassador Hotel, Los Angeles, Sidney H. Bierly, 475 Huntington Drive, San Marino 9, Cal., General Manager.

Nov. 10-11—Agricultural Aviation Research Conference, Milwaukee.

Nov. 11-13—New York State Insecticide and Fungicide Conference, 20th Annual Meeting; and 11th Annual Pesticide Application Equipment Conference, Bibbins Hall, Cornell University, Ithaca, N.Y.

Nov. 18-20—Washington State Weed Conference, Moses Lake, Wash.

Nov. 19-20—Carolinas-Virginia Pesticide Formulators' Assn., Carolina Hotel, Pinehurst, N.C.

Nov. 16-18—National Fertilizer Solutions Assn., Netherland Hilton Hotel, Cincinnati, M. F. Collie, 2217 Tribune Tower, Chicago, Executive Secretary.

Nov. 24-25—Entomological Society of America, Eastern Branch, Annual Meeting, Lord Baltimore Hotel, Baltimore.

Dec. 1-4—Entomological Society of America, Annual Meeting, Hotel Utah, Salt Lake City.

Dec. 3-4—North Central Weed Control Conference, Netherland Hilton Hotel, Cincinnati.

Dec. 3-4—Annual Soil Fertility and Plant Nutrition Short Course, University of Missouri, College of Agriculture, Columbia, Mo.

Dec. 3-5—Agricultural Ammonia Institute, Annual Meeting, Morrison Hotel, Chicago, Jack F. Oriswell, Claridge Hotel, Memphis, Executive Vice President.

Dec. 8—Annual Soils and Fertilizer Short Course, Coffey Hall, University of Minnesota Institute of Agriculture, St. Paul.

Dec. 8-10—Chemical Specialties Manufacturers Assn., Annual Meeting, Commodore Hotel, New York.

Dec. 17-18—Beltwide Cotton Production Conference, Rice Hotel, Houston, Texas, sponsored by the National Cotton Council.

1959

Jan. 7-9—Thirteenth Annual Northeastern Weed Control Conference, Hotel New Yorker, New York.

Jan. 20-22, 1959—California Weed

Conference, Santa Barbara, Cal.

Jan. 22-24—Agricultural Aircraft Assn., Senator Hotel, Sacramento, Cal.; Wanda Branstetter, Chandler Field, Fresno, Cal., Executive Secretary.

July 7-9—Pacific Northwest Plant Food Assn., 10th Annual Regional Fertilizer Conference, Tacoma, Wash.

IMC Earnings Show Decline in 1957-58

CHICAGO—International Minerals & Chemical Corp. has reported net earnings after taxes of \$5,273,000 or \$2.09 per common share for the fiscal year ended June 30, 1958. This compares with earnings of \$6,961,000, or \$2.81 on the 2,337,287 common shares outstanding for the 1956-57 fiscal year.

The 1957-58 net earnings included a non-recurring credit of \$331,990, resulting from a change in the company's pension plans from an insured to a trustee basis. Sales for the 12 months just ended totaled \$103,663,000 compared with \$106,189,000. Earnings before taxes were \$6,303,000 compared with \$8,536,000.

Earnings for the fourth quarter of the 1957-58 fiscal year totaled \$2,753,000 or \$1.14 per common share, with the pension credit included. Last year's earnings were \$2,717,000, or \$1.12 per share. Sales for the quarter just ended were \$33,138,000 compared with \$33,575,000.

Louis Ware, board chairman, said that the sales decline, which occurred principally in the third fiscal quarter, reflected the general downturn in the nation's economy. He noted that potash export shipments were down for the most part because of accumulated inventories and dollar shortages in the foreign markets. Although sales of mixed fertilizers increased for the year, Mr. Ware said that profit margins were narrowed

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Classified advertisements accepted until Tuesday each week for the issue of the following Monday.

Rates: 15¢ per word; minimum charge \$2.25. Situations wanted, 10¢ a word; \$1.50 minimum. Count six words of signature, whether for direct reply or keyed care this office. If advertisement is keyed, care of this office, 20¢ per insertion additional charged for forwarding replies. Commercial advertising not accepted in classified advertising department. Display advertising accepted for insertion at minimum rate of \$11 per column inch.

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by unusual price competition when adverse weather conditions caused a delay in spring buying.

STUDY TO CONTINUE

MANHATTAN, KANSAS—Studies of fungus spores found in air will be continued at Kansas State College under a \$11,500 grant just announced by the United States public health service. Emphasis this coming year will be on spores which cause allergies, according to S. M. Pady, head of the department of botany and plant pathology and leader on the project.

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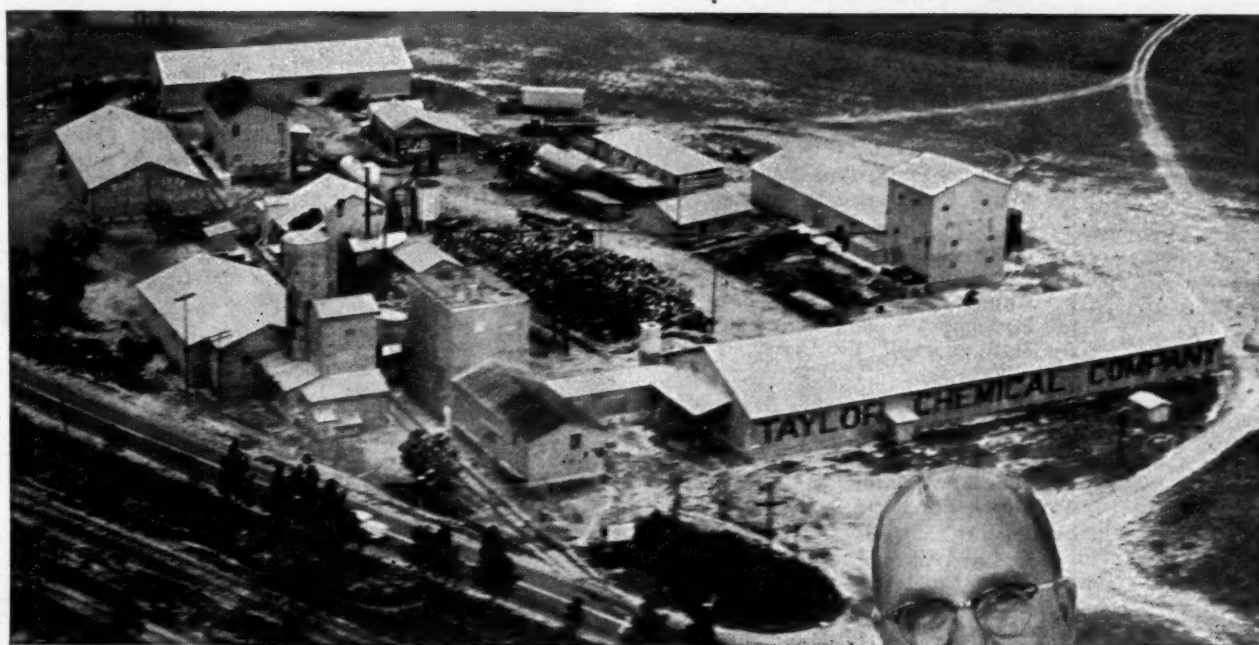
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Jones, Robin, Phosphate Co.	Velsicol Chemical Corp.
Kalo Inoculant Co.	Western Phosphates, Inc.
Kent, Percy, Bag Co.	
Kraft Bag Corp.	

CALENDAR FOR 1958-59

SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
S M T W T F S	S M T W T F S	S M T W T F S	S M T W T F S
1 2 3 4 5 6	1 2 3 4	1	1 2 3 4 5 6
7 8 9 10 11 12 13	5 6 7 8 9 10 11	2 3 4 5 6 7 8	7 8 9 10 11 12 13
14 15 16 17 18 19 20	12 13 14 15 16 17 18	9 10 11 12 13 14 15	14 15 16 17 18 19 20
21 22 23 24 25 26 27	19 20 21 22 23 24 25	16 17 18 19 20 21 22	21 22 23 24 25 26 27
28 29 30	26 27 28 29 30 31	23 24 25 26 27 28 29	28 29 30 31
		30	
JANUARY	FEBRUARY	MARCH	APRIL
S M T W T F S	S M T W T F S	S M T W T F S	S M T W T F S
1 2 3	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4
4 5 6 7 8 9 10	8 9 10 11 12 13 14	8 9 10 11 12 13 14	5 6 7 8 9 10 11
11 12 13 14 15 16 17	15 16 17 18 19 20 21	15 16 17 18 19 20 21	12 13 14 15 16 17 18
18 19 20 21 22 23 24	22 23 24 25 26 27 28	22 23 24 25 26 27 28	19 20 21 22 23 24 25
25 26 27 28 29 30 31		29 30 31	26 27 28 29 30
MAY	JUNE	JULY	AUGUST
S M T W T F S	S M T W T F S	S M T W T F S	S M T W T F S
1 2	1 2 3 4 5 6	1 2 3 4	1
3 4 5 6 7 8 9	7 8 9 10 11 12 13	5 6 7 8 9 10 11	2 3 4 5 6 7 8
10 11 12 13 14 15 16	14 15 16 17 18 19 20	12 13 14 15 16 17 18	9 10 11 12 13 14 15
17 18 19 20 21 22 23	21 22 23 24 25 26 27	19 20 21 22 23 24 25	16 17 18 19 20 21 22
24 25 26 27 28 29 30	28 29 30	26 27 28 29 30 31	23 24 25 26 27 28 29
31			30 31

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